Urban growth in relation to socio-economic development and westernisation: a case study of the city of Mashad, Iran

Darwent, David F.

Frontispiece - The Harram (Holy Quarter) at Mashhad

'URBAN GROWTH IN RELATION TO SOCIO-ECONOMIC DEVELOPMENT AND WESTERNISATION : A CASE STUDY OF THE CITY OF MASHHAD, IRAN'.

by David F. Darwent., B.A.

Thesis presented in candidature for the degree of Doctor of Philosophy in the University of Durham.

December 1965.

CONTENTS

	Page
Frontispiece	
Preface and Acknowledgements	iii
List of Tables	vi
List of Figures	xi
List of Plates	xv
1. Introduction - Urbanisation in the Middle East	2
PART I - BACKGROUND	28
2. The Setting	29
3. Historical Influences	43
4. Development in the Recent Past	61
PART II - THE SOCIAL STRUCTURE	93
5. Thesis	94
6. Population Density	100
7. The Demographic Structure	123
8. Literacy	153
9. The Structure of Occupations	173
10. Household Size	194
11. Movements of Population	210
12. Income and Expenditure	243
PART III - THE ECONOMIC STRUCTURE	270
13. Introduction and Thesis	271
14. Land Use and Land Values	276
15. Organisation of the Bazar in the Past	305
16. Economic Organisation and its response to Urban Growth and Technological Change	324
17. Location of Functions in Central Areas and on the Fronts of Main Avenues	367

	Page
PART IV CONCLUSION	398
18 General Conclusion	398
Glossary of terms	406
Selected Bibliography	408
APPENDICES	422
A. Statistical tables	422
B. Notes on statistical methods	446
C. Notes on Surveys	459

Overlays (2) in back pocket.

PREFACE and ACKNOWLEDGEMENTS

The origins of this volume lie in a period of three years' attachment to the Geography Department of the University of Durham as a research student. Of this period a total of about fourteen months was spent carrying out field work and collecting data in Iran, whilst the remainder of the time was spent in acquiring an elementary knowledge of the Persian language, in learning some basic statistical techniques, and in analysing the data and writing up the results.

The choice of the field of research was made on the basis of three main interests - urban studies, the application of quantitative techniques to geography, and the Middle East as a region, fostered by training in Durham both as a research student and an undergraduate. More specifically the subject was chosen as a contribution to what appears to be a relatively neglected field of urban studies - that is, the study of cities outside Europe and North America, and the relationship between urbanisation and socio-economic development in underdeveloped areas. It would appear that by far the greater part of urban research has been directed at cities of one particular culture area (Europe and North America) and both research techniques and generalisations about the nature of cities are as a result limited in scope by this. Yet 55% to 60% of the world's "urban" population lives in cities outside Europe and North America, so that the consideration of such cities is clearly of some importance. The lack of research in this field may well

be due to two common major difficulties which were faced at all times in this particular thesis. Firstly there is the problem of working in a culture area alien to the researcher. Whilst language problems are surmountable, the problem of being "culture - bound" to the western world is not so easily solved, and must occupy much time and energy if observations are not to be grossly biased and coloured by the background of the research worker. Secondly, statistical data in countries outside Europe and North America are notoriously deficient in both quantity and quality, and this raises many problems of analysis. It is often the case that even the simplest data are not available and must be collected in the field. Much time is therefore spent in carrying out surveys for basic statistics, which would be unnecessary in much of Europe or North America.

During the course of the work, the author has received much help, advice and co-operation from many individuals and organisations listed below to whom sincere thanks and indebtedness are recorded.

<u>For financial assistance:-</u>

The Royal Geographical Society

The Frederick Soddy Trust

The Skene Bursary Committee of University College, Durham.

The Department of Geography, Durham.

The Durham University Exploration Society

In Iran:-

The General Department of Public Statistics - Dr. Shahin,
Head of Department, and Miss Tamrezian.

The Bank Markazi, Tehran. - Dr. Abadian, Head of the Bank,
Mr. Reza Alavi, and Mr. Shahr-Karimi, of the Research Department.

The British Institute of Persian Studies, Tehran - Mr. B. Spooner
and Mr. D. Stronach.

The British Council, Mashhad, Mr. M.Jones and Mr. Mallowan.

Former Governor General of Khorasan, Col.Aziz.

The Ministry of Labour and Welfare, Tehran, Dr. Jamai.

The Department of Geography, The University of Tehran, Professor Ganji..

The Department of Social Research, University of Tehran, Dr. Naraghi,
Mr. P. Vielle, Mr. M. Qanadan.

The Department of History and Geography, The University of Mashhad -
Dr. Muffakham-Pain, and Mr. A. Saidi.

The British Embassy, Tehrah, Mr. B.Sykes

The Mortgage Bank, Mashhad, Mr. Sahami

The Department of Community Development, Mashhad, Mr.T.Modjtehedi.

Mashhad: - Mr. A. Mussadegh, Bazar Bozorg

Mr. J. Turbati, Bagh Sangi

Former Prime Minister of Iran, Dr. Alam

In England:-

Thanks are due to Dr. K.S. MaClachlan of the School of Oriental and African Studies, University of London whose help and advice were of great value in Iran. Finally, the author is indebted to Professor W.B. Fisher, Head of the Department of Geography, University of Durham under whose supervision this work was completed.

TABLES

Table		Page
Chapter 1		
1.	Degree of urbanisation, selected countries	9
2A.	Primacy : selected countries	13
2B.	Primacy within Iran	14
3.	Population growth of nations and cities in the Middle East	16
Chapter 4		
4.	Housing Units construction, Mashhad 1963	74
5.	Ethnic structure of population, Khorasan, 1892	78
6.	Main estimates of population of Mashhad, fourteenth century, to date.	84
Chapter 6		
7.	Mashhad, density and morphological history of main regions	111
8.	Main residential divisions of Mashhad	119
Chapter 7		
9.	Iran, selected areas, estimated population change, 1956 - 63	125
10.	Selected nations with "inverted" sex ratios 1955 - 61	127
11.	Sex Ratios in Iran, 1956	129
12.	Iran, selected areas, age structure in percent, 1956	131
13.	Iran, selected areas, general fertility ratio, 1956	143
14.	Iran, selected areas, incidence of marriage, 1956	145

Table		Page
	15. Iran, selected areas, dependency ratio, 1956	147
Chapter 8		
	16. Selected nations, comparative literacy rates	155
	17A,B. Iran, comparative literacy ratios, selected areas, 1956.	156
	18. Mashhad, literacy of adult population, 1956 - 63	158
Chapter 9		
	19. Iran, selected areas, Major occupations by employed population ten years old and over, 1956	175
	20. Unemployment, selected cities, Iran, 1956	180
	21. Economic activity status and economic dependency ratio, selected areas, Iran 1956, Pakistan 1951.	183
	22. Occupation by worker status for the employed population ten years old and over, Mashhad, 1956	185
	23. Occupations structure of 'active' population, 15 years old and over, selected areas Mashhad, 1963.	188
Chapter 10		
	24. Housing - selected Muslim countries	196
	25. Iran, selected areas, household size, 1956	198
	26. Urban Iran, percentage distribution of family type, 1959 - 60.	197
	27. Some correlations of household size, (A) Urban Iran (B) Mashhad 1959 - 60.	201
	28. Household size, rooms per household, income, Urban Iran, 1959 - 60	204

Table		Page
Chapter 11		
29.	India, internal migration, 1901 - 1951	212
30.	Iran, estimated population change, census provinces and other areas, 1956-63	213
31.	Percent of population "recently" in-migrant, Urban Iran and five large cities	215
32.	Life time migration by census province of birth to Mashhad Census District, 1956	217
33.	Mashhad, internal movements of households, selected areas, 1963	234
Chapter 12		
34.	Income and expenditure per capita per annum, selected nations, 1952-3	245
35.	Proportion of expenditure devoted to major items of consumption, selected areas, 1950-60	246
36.	General structure of consumption expenditures, Urban Iran 1959 - 60	249
37.	Structure of food expenditures, Urban Iran, 1959-60	250
38.	Proportion of families whose expenditure includes certain items, Urban Iran, 1959-60	254
39.	Summary table to Part II	263
Chapter 14		
40.	Mashhad, household industries, 1956	283
Chapter 15		
41.	Model of Bazar Economy, reference list of terms used	309
Chapter 16		
42.	Structure of selected industries, Mashhad, 1963	330
43.	Retailing and servicing functions, Mashhad, 1963	359

Table		Page
Chapter 17		
44.	Functional structure of central areas, Mashhad, 1963	373
45.	Price variations (in rials), central areas, Mashhad, May-July 1964	379,380
46.	Percentage distribution of functions on the fronts of selected main avenues, Mashhad 1963.	382

Appendix A

1. Population density, for 29 residential zones, Mashhad, 1963
2. Sex ratio of the population ten years old and over, and chi-squared tests, for 29 residential zones, Mashhad 1963.
3. Sex ratio of the population aged 15-34 and chi-squared tests for the 29 residential zones, Mashhad 1963.
4. General Fertility ratio, and chi-squared tests, for 17 residential areas, Mashhad 1963.
5. Dependency Ratio, and chi-squared tests for 29 residential zones, Mashhad, 1963.
6. Proportion of the population (10 years old and over) literate, and chi-squared tests, for 29 residential zones, Mashhad 1963.
7. Proportion of the population (males) (10 years old and over) literate, and chi-squared tests, for 29 residential zones, Mashhad 1963
8. Proportion of females (10 years old and over) literate, and chi-squared tests for 29 residential zones, Mashhad 1963
9. Proportion of females "active" and chi-squared tests for 29 residential zones, Mashhad, 1963
10. Proportion of the population 'recently' in-migrant, and chi-squared tests for 29 zones, Mashhad 1963
11. Distribution by origin (urban/rural) of the recently in-migrant population and chi-squared tests for the 29 zones, Mashhad 1963

12. Analysis of Variance - structure of expenditure on (a) items of general consumption (b) items of food consumption, Urban Iran. 1959 - 60.

13.A. Regression equations for expenditure groups 1-12, mean per capita expenditure per annum on items of general consumption, Urban Iran, 1959-60.

13B. Regression equations - for income groups 1 - 12, mean per capita expenditure per week on items of food consumption (rials), Urban Iran, 1959-60.

14. Regressions equations for (a) items of general consumption, (b) items of food consumption, expressed as percentage deviations from their respective means, and estimated elasticity coefficients, Urban Iran 1959-60.

15. Chi-squared tests for the distribution of functions along Balakhiaban.

16. Chi-squared tests for the distribution of functions along Khiaban Pahlevi.

17. Chi-squared tests for the distribution of functions along Pain Khiaban, and Khiaban Tabarsi.

18. Regressions equations for the distribution of functions along Balakhiaban.

19. Regressions equations for the distribution of functions along Khiaban Pahlevi.

20. Regressions equations for the distribution of functions along Pain Khiaban.

21. Regressions equations for the distribution of functions along Khiaban Tabarsi.

FIGURES

Figure		Page
Chapter 2		
1.	Mashhad. Location in relation to the Old Silk Road and Mediaeval routes across Central Asia.	30
2.	General Location map.	31
3.	Site and former water supply system.	32
4.	Site and main lines of flood drainage.	35
Chapter 4		
5.	Mashhad 1874-5	64
6.	House Types in Cross-section.	65
7.	Orientation of streets and some features of the old town.	67
8.	Present day street system	68
9.	Growth series of maps.	72
10.	Estimated growth of population, 1700-1963.	85
Chapter 6		
11.	Density of Population, Mashhad 1963.	101
12.	Density - distance relationships, Mashhad 1963.	116
Chapter 7		
13.	A.B.C. Age - Sex comparisons.	129
14.	Sex Ratio of age group 15 - 34, Mashhad 1963.	139
15.	General Fertility Ratio, Mashhad 1963.	142
16.	Dependency Ratio, Mashhad 1963	147

Figure		Page
Chapter 8		
17. A.	Proportion of population (10 years old and over) literate, Mashhad 1963.	161
17. B.	For proportion of population literate, regional share in percent, of the total chi-squared value, Mashhad, 1963.	161
18. A.	Proportion of males (ten years old and over) literate, Mashhad 1963.	162
18. B.	For proportion of males literate, regional share in percent, of the total chi-squared value, Mashhad, 1963.	162
19. A.	Proportion of females (10 years old and over) literate, Mashhad, 1963.	163
19. B.	For proportion of females literate, regional share in percent, of the total chi-squared value, Mashhad 1963.	163
20.A.B.	Linear distribution of literacy, Mashhad 1963.	164
21.	Proportion of females 'active' Mashhad 1963.	165
22.	Distribution of schools and other educational facilities, Mashhad 1962.	168
Chapter 9		
23.	The Occupations structure, selected areas, Mashhad, 1963.	188
Chapter 10		
24. A.	Distribution of Households with more than six persons, Mashhad 1963.	205
24. B.	Distribution of Households with two or fewer persons, Mashhad, 1963.	205
Chapter 11		
25.	Average annual population change by migration, KHorasan, 1956,63.	219

Figure		Page
Chapter 11		
26	Proportion of Population 'Recently' in-migrant, Mashhad 1963.	229
27	Distribution by origin of the'recently' in-migrant population, Mashhad, 1963.	231
28A	'Recent' internal migration to selected areas in the south, Mashhad 1963.	233
B	'Recent' internal migration to selected areas in the west, Mashhad 1963.	233
C	'Recent' internal migration to selected areas in the north, Mashhad 1963.	233
D	'Recent' internal migration to selected areas in the centre, Mashhad 1963.	233
Chapter 12		
29	Linear distribution of family income and per capita family expenditure, Urban Iran and Mashhad 1959-60.	246
30	Regressions lines for structure of family per capita expenditure, Urban Iran 1959-60.	252
31	Regressions lines for structure of family per capita expenditures, expressed as percentage deviations from respective means, Urban Iran 1959-60.	253
32	A to F. Distribution of Family Income, Mashhad 1959-60.	261
33	A and B. Distribution of Family per capita Expenditure, Mashhad 1959-60.	262
Chapter 14		
34	Generalised Land Use, Mashhad, 1963.	227
35.	Land use in the Old Town centre, 1964.	255
36	Land use in the New Town centre, 1964.	291
37	Land values on the first ten metres of main avenues, 1960	295
38	Land Values in the Interior of blocks, 1960.	299
39	Cross-sectional comparisons of Urban Land Values.	309

Figure		Page
Chapter 15		
40	A, B. Economic organisation, Mashhad.	373
Chapter 16		
41	Flow diagram, textile industry, Mashhad.	333
42A	Distribution of central functions, old town residential zone.	360
B	Distribution of central functions, new town, residential zone.	361
Chapter 17		
43	Distribution of Functions along Balakhiaban	384
44	Distribution of Functions along Khiaban Pahlevi	387
45	Distribution of Functions along Pain Khiaban	391
46	Distribution of Functions along Khiaban Tabarsi	393
Back Pocket	Overlay 1. The 29 Residential zones	
	Overlay 2. Names of some main streets.	

PLATES

Frontispiece	Page
1. Mashhad in 1858	63
2. A Kutche in the old town	63
3. A 'main' kutche with commercial premises alongit.	69
4. Bazar Sangtarshah, near Harram	69
5. Pain Khiaban, a general view facing the Harram	75
6. Inside Bazar Bozorg	75
7. The Old town, from the air	95
8. The New town, from the air	95
9. The old town centre, looking west from the Harram	103
10. The old town centre, looking north-east from the Harram	103
11. A view in the southern suburbs of the city	109
12. New town, 'Pahlevi' type houses	109
13. Hand production - the manufacture of mosaic tiles	178
14. Bazar Sarshur, a bazar in decline	178
15. The margin of the built up area, in the south-west	281
16. A suburb of the new town, Sa'adabad	281
17. Caravanserai of the old type, near Mashhad	286
18. Caravanserai on Pain Khiaban,with narrow entrance	286
19. Newly built caravanserai (serai) near the Harram	288
20. A suburban brickworks	288
21. Land under speculation, formerly a garden in the south-east of the city	290
22. Caravanserai with cereal merchants and millers-Pain Khiaban	290

		Page
23.	Caravanserai, used for pilgrim accommodation - Pain Khiaban	293
24.	The new Khiaban running south off Pain Khiaban	293
25.	A coppersmith/tinsmith shop, in the old town	343
26.	The old town centre - Bazar Bozorg	343
27.	The old town centre, looking south-east	368
28.	The old town centre, looking west	368
29.	Second floor dereliction and rebuilding, BalaKhiaban	375
30.	A shop in the new town centre	375

'With regard to the amount of prosperity and business activity in them, cities and towns differ in accordance with the different size of their population. The reason for this is that as is known and well established , the individual human being cannot by himself obtain all the necessities of life. All human beings must co-operate to that end in their civilisation'

Ibn Khaldun 1377

1. INTRODUCTION - URBANISATION IN THE MIDDLE EAST

It is increasingly obvious as the world enters the later stages of the twentieth century that one of the most fundamental divisions within it is between the rich advanced and developed nations of Europe, North America, and Australia, and the relatively poor, backward and underdeveloped nations of Latin America, Africa and Asia, including the Middle East. This latter is here considered to include Turkey, Iran, Iraq, Jordan, Syria, Lebanon, Israel, Cyprus, the states of the Arabian peninsula, and two nations of North Africa - Egypt, and Libya, all of which can be considered to be 'underdeveloped' by the United Nations definition. The Committee of experts on underdevelopment set up by the U.N.Secretary-General, says of the term'underdeveloped' -

> 'We use it to mean countries in which the per-capita real income is low when compared with the per capita real income of the United States of America, Canada, Australia and Western Europe'

- the term 'underdeveloped' is used in the same sense in this thesis. Within the Middle East, as defined above, development is taking the form of revolutionary economic and social changes, causing a disruption of the pre-industrial, traditional ways of life that have existed for centuries, and leading to the establishment of new systems of economic, social and political organisation. The growth of a new type of urbanism in the Middle East is regarded as being one of the main aspects of this.

There is little doubt that a close relationship exists between economic development and urbanisation, defined as the growth in the number

and size of cities, and the increase in the proportion of the population living in urban areas. It appears that large cities of the Middle East such as Mashhad (312,000 1963) are in many ways the focal point of development, and of the transition from the traditional to the modern way of life. It is within the city, set up by the modernising society to carry out central functions, that changes are most evident, and the city plays a role as a diffusion point for economic and social change. However, before becoming involved in particulars of the city, it is of value to review the recent literature on the nature of cities of the underdeveloped world in general, and of the Middle East in particular, to indicate the main characteristics of the family of which Mashhad is a member.

1. <u>The Pre-Industrial city, past and present</u>

Both Pirenne[2] and Sjoberg[3] have provided discussions on the nature of the mediaeval or pre-industrial city, and the latter considers also those pre-industrial cities which still exist today in some of the underdeveloped parts of the world. It is clear that the pre-industrial city was, and is characterised by the dominance of a single function or a very few functions. Cities were political administrative centres, or perhaps trading centres on the edge of the desert, or the coast, whilst others, like Mashhad, existed to perform the function of a religious centre, the archetype of which is Mecca. This characteristic was partially due to the fact that cities were above all the product of a

particular dynasty, or power structure, and were located by the dynasty, and grew and declined with it. In the words of Ibn Khaldun,[4] "If the dynasty is of short duration life in the town will stop at the end of the dynasty. Its civilisation will recede, and the town will fall in ruins. On the other hand, if the dynasty is of long duration and lasts a long time, new constructions will always go up in the town, the number of large mansions will increase and the walls of the town will extend farther and farther!' As Sjoberg shows, the Persians had one of the earliest urbanising civilisations, responsible for the creation of many cities and

> 'carried city life into what are now Afghanistan and western Turkestan'-

an area which includes Mashhad, and its province Khorasan, whilst

> "... by A.D.1 most of the Middle East was urbanised to a degree" 5

Pre-industrial cities, of which Mashhad must be counted one until the early twentieth century, were small, rarely exceeding 100,000 persons, though occasionally attaining perhaps 250,000 as did Isfahan and possibly Mashhad in the seventeenth century. More significantly, urban life affected only a small proportion of the population and 'comprised no more than 10% of feudal societies'[6] Manufacturing was on a small scale and by hand methods, and was not restricted to urban areas as it tends to be in modern cities, but was carried out in rural areas also. Trade was a much more important economic basis in the life of the pre-industrial city. Society organised along the traditional kin, or clan lines, had few facilities for vertical mobility, and rule was by the authority of birth. The

pre-industrial city, chrysalis in many instances, of the present fast growing metropolis of the Middle East,was -

> "... limited by the needs and capacities of a rural hinterland and a highly satisfied society!' ..."Inhabitants of town and country alike were imprisoned within their physical and mental horizons. To escape meant to transcend rather than transform the environment, and as a consequence, men lacked much mastery over nature" 7

Thus the city of the pre-industrial world was of limited function, and affected only a small part of society. Added to this however, we must distinguish with Weber[8] and von Grünebaum[9] between the pre-industrial city of mediaeval Europe, and that of the Orient - particularly the Middle East. In Europe, the mediaeval city was in many ways the true forerunner of the modern city, for it was based on the concept of 'civitas' - a community of citizens living and working together. In the Middle East, the city developed in the tradition of the 'medina' - a city existing within a political framework, centred around the palace of the ruling elite, and later under muslim influence around the cathedral mosque - with little civic co-operation or communal participation. This distinction is of importance, since it enhances the contrast separating the traditional city of the Middle East from its modern successor, the growth and development of which are hampered by the lack of a civic tradition.

Culturally, the pre-industrial city was, in the typology of Redfield and Singer,[10] the 'orthogenetic' type -

> '... a place where religious, philosophical and literary specialists reflect, synthesise and create out of the traditional material new arrangements and developments which are felt by the people to be outgrowths of the old'.

In the world of illiteracy, the literate elite and their sacred book (the Koran in the Middle East) were venerated without being understood, and tradition and authority were never in danger of being challenged. Redfield and Singer's[11] antithesis, the 'heterogenetic' type, is a city more commonly associated with the industrial world, one in which change, heresy, dissent, and progress are common, with a wider basis of education, and actions motivated less by religious authority, more by expediency - a type which increasingly characterises the Middle East today.

2. <u>Cities, and city systems under conditions of change</u>

In most of the underdeveloped countries of the Middle East, features of the pre-industrial world and traditional society are being swept away by the process of economic and social development (modernisation) and by the assimilation consciously and unconsciously of technical and cultural innovations largely stemming from the western world (westerhisation). Moreover, it is the cities of these nations that experience these changes most intensely, and in which the interaction between traditional and modern is most acute. Additionally, an increase in the number and size of cities, and in the proportion of the population living in them (urbanisation) means that an increasingly larger population is experiencing the far-reaching changes taking place. This trend has been noted elsewhere in the world. Davis

and Golden talking about the pre-industrial areas in general, indicate that

> 'Since urbanisation is not an isolated culture trait but is a function of the total economy, its rapid growth indicates that fundamental changes are occurring at a rate sufficient to transform these pre-industrial societies in a few decades'. 12

We can view these 'fundamental changes' in two senses, quantitatively and qualitatively.

A. Quantitative aspects of Urbanisation

Indices of urbanisation rely on measuring the proportion of the population of a nation (or region) living in cities of an arbitary size (- 20, 25, 50 and 100,000 have been common size limits) and relating this to the proportion of the population in agricultural occupations. The proportion of the world's population living in cities of 20,000 or more persons, is about 21%, compared to 35% for Europe, 42% for North America and only 13% for Asia. In effect it is the more developed and industrialised areas of the world which are also the most urbanised. Yet because Asia has so large a population, its urban dwellers (at the 20,000 level) are 33.8% of the world's total, compared to 27.5% in Europe and 13.9% in North America - much of the world's urban population is in underdeveloped regions.[13] (See table 1) Moreover, if the proportion of the population which is urban is plotted against time, we find that rates of urbanisation in the developed nations are slowing down, whilst these of the underdeveloped world are just beginning to accelerate.

Table 1

DEGREE OF URBANISATION, SELECTED COUNTRIES. Percentage of total population in cities of 20,000 or more, 1955.

Rank	Nation	%	Rank	Nation	%
1	Hong Kong	95.0	47	Iraq	23.6
3	United Kingdom	66.9	48	Lebanon	23.0
4	Australia	57.3	55.5	Tunisia	19.9
6.5	U.S.A.	52.0	59.5	Libya	18.4
8	Netherlands	48.3	70	Turkey	14.5
22	Canada	35.1	71	Algeria	14.1
23	Sweden	33.0	77	Yugoslavia	12.5
25.5	U.S.S.R.	32.4	78	India	11.9
34.5	Egypt	29.1	84.5	China	10.0
34.5	Switzerland	29.1	86	Saudi Arabia	9.5
42	Jordan	25.5	87	Indonesia	9.1
43	IRAN (a)	24.5	88.5	Pakistan	8.0
44	Morocco	24.2	92	Afghanistan	7.5

World Mean 21.6%

Source - Ginsburg, N. 'Atlas of Economic Development' Chicago, 1961

(a) Iran - Census of Iran, 1956.

The total number of nations in the original table was 123.

The rate of increase for example of the proportion of the population 'urban' in India 1910-50 was almost exactly the same as that of the U.S.A., 1810-1850.

Berry[14] has shown that urbanisation rates are positively related to development, and it is the nations with advanced societies, high degrees of industrialisation (measured by the proportion of the active population working in agriculture) and a 'mature' demographic structure, that are the most urbanised; whilst the underdeveloped nations which are just beginning to acquire these characteristics are as yet little urbanised, but are becoming so as they develop. This implies [redacted] as Davis and Golden[15] have pointed out, that the present discrepancy between developed and underdeveloped nations in terms of urbanisation, is a temporary one and as rates of urbanisation increase in the underdeveloped areas, it may be that the urban population of the world will 'within fifty years' be distributed in proportion to the total population, as it probably was before 1800.[16]

The relationship between the level of urbanisation and industrialisation has interested many research workers, and the term 'over - urbanisation' has grown up as a result. Thus the UNESCO report of 1957 indicates that for the proportion of population in cities of over 100,000,

'... it can be said that roughly one in twelve in Asia is

a city dweller as against one in eight in the world as whole, approximately one in three in North America and one in five in Europe (including the U.S.S.R.)

Such a degree of urbanisation is associated in Asia with a degtee of industrialisation corresponding to 30% of the labour force engaged in non-agricultural activities. At comparable periods of urbanisation levels the United States (1850's), France(1860's), Germany (1880's) and Canada (1890's) had roughly 55% of their labour force engaged in non-agricultural occupations. Thus Asia can be said to be comparatively over-urbanised in relation to its degree of economic develop-ment'. 17.

With about one in six a 'city dweller' and 45.2% of its labour force in non-agricultural activities Iran would also appear to be 'over-urbanised' by this definition. Davis and Golden[18] using different techniques for a large number of nations came to a similar conclusion - citing Egypt as the most 'over-urbanised' nation of all (about one in five urban, and 38% of occupied males in non-agricultural activities). However as Sovani[19] pointed out, this concept of 'over-urbanisation' relies on the experience of nations of the western world, and implies that 'over-urbanised' countries are so merely because they have a larger proportion of their population in cities, and a small proportion in non-agricultural occupations than did western nations in the past. Clearly this has little meaning, since conditions of development in the twentieth century are in many ways dissimilar to those when characterised development in nineteenth century Europe and the U.S.A.

Recent studies discussed below have shown that the concept of

'over-urbanisation' in relation to non-agricultural employment is not only of doubtful validity, but is by no means such a fundamental problem as that of 'primacy' - the existence in a country of one city whose population is so large as to dominate the country, creating problems of centralisation. Measures of primacy have proliferated since Jefferson[20] first expressed the population of a nation's largest city as a percentage of its three largest. A common measurement now in use employs the four largest cities (Table 2A). The concentration of the urban population into one large city is a common feature of both under-developed and advanced nations, and results in the city becoming 'parasitic' on the economy. However, primacy tends to be a more serious problem in countries of the underdeveloped world, especially the Middle East, for there is in such countries a notable absence of cities in the middle size range, - unlike the case of the advanced nations of Europe and North America, which have well developed hierarchies of cities. Janet Abu-Lughod[21] has found 'primacy' to be particularly serious in Egypt where Cairo dominates the country's urban population, and draws heavily on the economy. Yet other countries have much higher primacy rates than Egypt - Iran 65.8%, Lebanon 70.6%, France 74.7%, Tunisia 75.6% (Table 2A). Each of these countries is dominated by its capital city, and in the case of Iran (Table 2B), primacy is a feature of some of the regions also - Khorasan, dominated by Mashhad has a rate of 76.3%

The causes of primacy are obscure. Many authors have indicated

Table 2A

PRIMACY - SELECTED COUNTRIES. The population of the largest city expressed as a percentage of the population of the four largest, 1955.

RANK	NATION	VALUE	RANK	NATION	VALUE
1	Italy	32.1	44	Morocco	55.2
4	Syria	37.8	46	Turkey	55.9
6	Canada	40.1	54	Libya	60.2
10	Australia	42.0	55	U.K.	60.3
15	Switzerland	43.6	60	Egypt	62.0
21	Pakistan	45.2	64	Sudan	63.7
22	Jordan	45.3	68	IRAN(a)	65.8
24	W.Germany	46.4	77	Lebanon	70.6
26	Afghanistan	46.4	84	Mexico	74.3
34	U.S.A.	49.6	85	France	74.7
39	Algeria	51.1	87	Tunisia	75.6
43	U.S.S.R.	54.8	104	Thailand	94.2

Source. Ginsburg, M. Atlas of Economic Development, Chicago 1961.

The total number of states in the original table was 104.

(a) Iran - from Census of Iran, 1956.

Table 2B

PRIMACY - WITHIN IRAN. The population of the largest city (named) as a percentage of the four largest, selected regions, 1956.

Region	Value
Khorasan (Mashhad)	76.3
East Azerbaijan (Tabriz)	70.2
Fars - Banader (Shiraz)	79.1
Isfahan - Yazd (Isfahan)	64.7
Khoozistan - Luristan (Abadan)	54.4

Source - Census of Iran, 1956

colonialism as a cause, claiming that the alien colonial economy with its many trading and administrative needs and centralised organisation, is responsible.[22] However this is unlikely to be the explanation in the case of Iran, Lebanon, or Turkey for example, though economic rather than political domination might be responsible. Large cities are not new in the Middle East, for Cairo attained 300,000 in about 1800[23], and Damascus may have been of a similar size during the nineteenth century. In Iran Isfahan may have attained 250,000 in the seventeenth century[24] and Shiraz was said to have 200,000 in the fifteenth century,[25] whilst Mashhad itself may have had 300,000 early in the eighteenth century.[26] Thus primacy in the Middle East may not, as supposed, be a modern phenomenon, and as Mugubumje[27] has shown, many states had city systems fully developed before the influence of colonisation and the present wave of urbanisation were felt - this was the case in Nigeria, for instance.

B. Qualitative aspects of urbanisation

Perhaps the characteristic most commonly held by cities of the underdeveloped world today is a high rate of growth, which can sometimes be spectacular - and normally greater than the national rate - as is the case in some Middle Eastern cities (Table 3). These high rates of growth are sustained largely by urbanward migration, rather than by net increase of births over deaths, for general fertility rates are low in urban areas. There is in the world at large, a vast urban-ward movement of population, which in countries of the underdeveloped world is made all the more obvious

Table 3

POPULATION GROWTH in the MIDDLE EAST. Recent annual rates of growth of selected cities compared to national rates, at various dates, in thousands.

AREA	DATE	POPULATION AT FIRST DATE	POPULATION AT SECOND DATE	ANNUAL % GROWTH
EGYPT	1947-60	16,043	21,393	2.6
Cairo	"	2,091 (a)	3,346 (a)	4.6
Alexandria	"	919 (a)	1,513 (a)	5.0
SYRIA	1955-60	3,861	4,555	3.6
Damascus	"	408	529	5.9
Aleppo	"	407	426	0.9
ISRAEL	1955-62	1,748	2,183	4.2
Jerusalem	"	146	167	2.1
Tel Aviv	"	363	386	0.9
JORDAN	1952-61	1,329	1,690	3.0
Amman	"	108 (b)	244	15.7
TURKEY	1955-60	24,065	27,829	3.1
Istanbul	"	1,269	1,925	10.3
Ankara	"	451	1,316	10.0
LIBYA	1954-64	1,089	-	-
Tripoli	"	130	213	6.4
LEBANON	1952-58	1,321	1,569	3.1
Beirut	"	250 (c)	400 (d)	10.0
IRAN	1956-63	18,955 (e)	22,523 (f)	2.7
Tehran	"	1,512 (e)	2,317 (f)	7.6
Isfahan	"	255 (e)	340 (f)	4.8
MASHHAD	"	242 (e)	312 (f)	4.1

Source, U.N. Demographic Yearbook 1962, except where specified -

(a) Census of Egypt, quoted in Janet L.Abu-Lughod, op.cit.(note 21)

(b) Housing Census, quoted in Jane Hacker 'Modern Amman', Department of Geography, University of Durham, Research Series 3, 1960.

(c) Estimate, in Riachi, G. 'Beirut', in Morroe Berger, op.cit.(note 23)

(d) Estimate, U.N.Demog. Yearbook 1962. (e) Census of Iran, 1956.

(f) Sample Survey of Iran, 1963

since it brings the traditionally oriented villager into contact with new systems of life and values in the city, creating many social problems. The factors leading to this mass movement of population are complex, and vary from case to case. However it is generally true to say that as nations begin to progress, then specialised functions develop, secondary and tertiary, which can be carried out best in an urban centre of easy access to all, creating a demand for labour, and therefore for an urban population. The growth of industries in urban areas is an aspect of this. More specifically, the reasons for migration fall into two groups; these are the 'pull' factors and the 'push' factors. Pull factors attracting the rural population to the city include the possibilities of employment in the city (real or illusory) and the desire to benefit from the material aspects of development and an awareness that opportunities are greater in the city. Push factors are also important however. An I.L.O. study on labour movements indicated :-

> 'The main push factor causing workers to leave agriculture is the lower level of incomes. In almost all countries incomes in agriculture are lower than in other sectors of the economy'... 'Although the push factors of falling incomes and underemployment in agriculture in most of the less developed countries are very strong, they do not in the absence of strong pull factors, suffice to cause large shifts in manpower between occupations' 28.

Janet Abu-Lughod has shown for Egypt that 'in a study conducted in Egypt on the motivation for rural to urban migration, it was found that a recurring theme was the precipitating force of a single disaster'[29].

The death of the family water buffalo, a flood, a water-shortage, or loss of lease can in the presence of pull factors be important reasons for the movement of people to urban areas. However, other factors are sometimes important, such as the increasing commercialisation of agriculture, which makes it difficult for the villager to survive on a subsistence basis; and the growth of mechanised industries in the cities with which the rural handicrafts cannot compete.

In the presence of these economic and social developments, the pre-industrial city of the Middle East is being forced to take on new roles, and its internal structure is being modified and re-organised as it grows. Demographically cities of the Middle East are characterised by unbalanced sex-ratios with large numbers of males, and fewer females, particularly in the adult age group -15-45, whilst there appears to be a direct relationship between city size and the extent to which the sex ratio is characterised by an excess of males. However, in the Middle East, this must be set against the fact that in many of the nations males outnumber females in any case - unlike the western world where the opposite is the case. As in the world in general, cities of the Middle East also tend to have a greater proportion of adults and fewer young and old people than the rural areas, in which dependency ratios are usually higher. The fact that many of the in-migrant males in the cities are supporting rural dependents only partially affects the urban rural difference in the dependency ratios. Mortality rates are high in both rural and urban areas of Asia, though infant mortality tends to be lower in the urban areas of

some countries - (15 to 50% lower in countries of the ECAFE region[30]). There appears also to be an inverse relationship between general fertility and city size for Japan, and also for Iran.

Socially, and economically, there exist other highly characteristic features of these fast-growing cities of the Middle East. In the past, manufacturing and processing were as much a rural as an urban activity, but today manufacturing is increasingly concentrated into urban areas, so that large numbers of secondary workers are common. Yet because mechanisation and industrialisation are not fully developed, many urban industries are still on a small scale, and use hand methods. Hoselitz has shown that the number of self-employed operatives and artisans in cities of India has grown more than proportionally as the cities have grown.[31] Tertiary functions such as retailing or administration are largely restricted to the cities in the Middle East, but the large number of workers in tertiary occupations is not to be interpreted as evidence of a high level of socio-economic development, rather is it symptomatic of the high rates of under-employment which are as much a feature of these cities as is the large amount of unemployment in them.

Middle Eastern cities have many other features in common, most evident being their morphology. The present morphology is the result of growth from a pre-industrial centre, except of course in the case where a city was founded in the twentieth century - such as Abadan. There is normally an old town area of narrow streets, inaccessible to wheeled vehicles, and mud-brick houses inhabited by the less wealthy, less educated

and generally

underprivileged members of the population. In contrast are the new town areas often laid out on a grid-iron street pattern, in which the wel-thier, better educated, and more 'westernised' people live in conditions of relative luxury contrasting starkly with conditions in the old town. In many cases, the new town area also has its own town centre, separate from the bazar area. Many cities have in addition a 'bidonville' of slums or shanties, usually located in a peripheral area of the city and occupied by the more unfortunate of the recent in-migrants. Throughout the Middle East, such features tend to be a common factor of cities today, from Istanbul to Cairo, and from Tehran to Tripoli, for they are the result of the influence of economic and social developments on the pre-industrial city of the eighteenth century and nineteenth century discussed above.

The role of the city in the developing Middle East is changing . Increasingly the city is becoming the point at which central functions are carried out, and it has increasing economic and regional importance as agriculture becomes more commercialised, calling for centralised functions such as marketing, and as society develops the need for central points of production and services. Because of this, the city id above all the receptor of change, and a spearhead in the transition from the traditional society and economy of the muslim, pre-industrial world, to the modern society and economy based on specialisation and industrialisation, amd the adoption of new techniques.

3. The Contents and methodology of the thesis

We have seen at a general level the type of city now developing in the Middle East, of which Mashhad is a representative, and it is now possible to indicate the aim, scope and methods used in this thesis. Amongst the many writers on urbanism in underdeveloped areas, Professor B.F.Hoselitz[32] has perhaps made the most significant contributions, and it is from his view of the objectives of underdevelopment research in the future that this thesis springs. Hoselitz considers that research in underdeveloped areas has until recently been over-specialised in the direction of economic theory, which assumes a constant and unchanging society and culture, and is to this extent only a partial analysis of the phenomenon of development. 'What is needed therefore, is not merely a theory of economic growth in purely economic terms, but a theory relating economic development to cultural change'[35] Hoselitz also indicates however that in the present state of our knowledge of development, such a general theory is unlikely to emerge and any attempt at formulating one

> 'may lead into the impenetrable jungle in which have been lost, so many who searched the way to the formulation of a general theory of history' 34

However, attempts at a more limited objective may be of some value and have a greater chance of success. In practice there are many examples of this. The elaboration of a development plan for a nation for instance, must embrace not only economic variables but to some extent social and cultural consideration, if it is to succeed; and planners are normally faced

with the consideration of non-economic variables. Hoselitz concludes that research on underdevelopment is more likely to be of value if

> 'Instead of being concerned with the problem of economic growth in the most general terms we are interested in elaborating a theoretical model which permits us to analyse a process of transition form a social system displaying one form of economic organisation to one displaying a different, presumably 'more advanced' economic organisation' 35.

This thesis is an attempt to formulate a model (in the form of a simple hypothesis) and to analyse the 'process of transition' referred to above, in one city of the underdeveloped world - Mashhad - using the methods and techniques of geography as its basis. It is a geographical contribution to the study of development as it occurs at one particular place, though comparisons are developed throughout the thesis, where appropriate. Part I of this volume presents some selected background data of a descriptive nature, which provides a summary of the main influences, physical historical and cultural, which have affected the city in the past. Part II opens with a statement of the hypothesis of development which is used as a basis of analysis in the present day city, and continues with an analysis of the demographic and social structure of the city, and changes within this structure due to modern developments. Part III develops the hypothesis in economic terms indicating the ways in which economic organisation within the city responds to the changes in the social structure discussed in Part II, and to the technological innovations being assimilated. The

effect of this response on the land use and land value structure of the city is also discussed. The conclusion is presented in Part IV.

Throughout part II and III of the thesis, and within the limits of the available data, which are deficient in both quantity and quality, quantitative analysis involving a number of statistical methods is used where appropriate. The quantitative approach has been chosen for several reasons. Firstly it is believed that if the geographical method is to continue its progress, and justify its existence, then some attempt must be made to express the descriptions and analyses made in quantitative terms. Secondly it would seem desirable that a degree of objectivity be maintained in the subject so that a common language affected as little as possible by personal value judgements can be preserved. Thirdly, statistics of underdeveloped areas such as Iran are notoriously inaccurate and deficient, so that the use of simple statistical methods of testing is unavoidable if we are to recognise and sidestep the major errors, and prevent false interpretations of the available data. The use of statistical methods also makes it possible to state in numerical terms the probability of the accuracy of the statements made, and to what extent conclusions based on these statements are valid. Lastly, since data are limited in quantity in Iran, then it is of great importance to use what are available in a comprehensive fashion, gaining as much information as possible; to this end statistical methods are of value. This is particularly relevant here, for in the absence of detailed census data, much dependence is placed

upon the use of samples, and some statistical methods are necessary if valid statements about the total population are to be made from observations of the sample population.

The statistical methods used are of the most elementary kind, and are referred to only briefly in the text. Fuller explanations of the methods used, and the way in which they are applied, are available in Appendix B.

Notes to text and references

1. "Measures for the economic development of underdeveloped countries". Report to U.N., quoted in

Higgins, B, "Economic Development" London, 1959. p.6.

2. Pirenne, Henri, "Mediaeval Cities" Princeton, U.S.A. 1925.

3. Sjoberg, G. "The pre-industrial city - Past and Present" Glencoe, Ill. U.S.A. 1960

4. Ibn. Khaldun "The Mugaddimah" ed. and trans. Rosenthal, F. New York. 1958 v.2. p.235.

The quotation at the head of the thesis is from the same work v.2. p.271

5. Sjoberg, op.cit. p.54

6. ibid. p. 55

7. Lampard, E.E. "The History of cities in the economically advanced areas" J. Ec.Dev. and Cult.Change III, 2. Jan.1955.

8. Weber, Max. "The City" Trans. and ed. by Martindale, D. and Neuwirth, G., Glencoe, Free Press. 1958.

9. Von Grunebaum "Essays in the nature and growth of a cultural tradition" Chap IV, London, 1955.

10. Redfield, R. and Singer, M. "The Cultural Role of Cities" J. Ec.Dev. and Cult. Change, III, 1, Oct.1954.

11. ibid.

12. Davis, K.D. and Golden H.H, "Urbanization and the Development of Pre-Industrial Areas" J.Ec.Dev. and Cult.Change III, 1, Oct.1954. p. 11

13. UNESCO. "Urbanization in Asia and the Far East,:Hauser, P., (ed). Proc. of Joint UN/UNESCO Seminar, Bangkok, Aug.1956. Pub.Calcutta. 1957. Figures are from Chap.IV "Demographic Aspects of Urbanization in the ECAFE region" U.N. Bureau of Social Affairs, Population Branch, p.101.

Notes to Text and references

14. Berry, B.J.L. "Some relations of urbanization and basic patterns of economic development" in. Pitts, F.R, (ed). "Urban Systems and Economic Development" School of Business Admin. Univ.Oregon, 1962.

15. Davis and Golden, op.cit. loc.cit.

16. ibid.

17. UNESCO. op. cit. p.113

18. Davis and Golden op.cit.p.8.

19. Sovani, N. "The analysis of 'over-urbanization"J. Ec. Dev. and Cult.Change, XII, 2, Jan.1964. p.117.

20. Jefferson, M. "The law of the Primate City" G.R. vol.29,2, April 1939.

21. Janet L.Abu-Lughod "Urbanization in Egypt: Present State and Future Prospects", J.Ec.Dev. and Cult. Change Vol.XIII, 3, April 1965.

22. Ginsburg, N. "Atlas of Economic Development" Chicago, 1961, p.36.

23. Wahba, R., "Cairo" in- Monroe Berger, (ed.) "The new metropolis in the Arab World". Proc. of seminar on City Planning and Social Problems, Cairo 1960. Pub. New Dehli 1963. p.28.

24. Chardin, J. "Voyages du Chevalier Chardin, en Perse, et autres lieux de l'Orient" vol.VII p.287 ed. by L.Langles, Paris, 1811.

Chardin claims that the population was 600,000, but this may include the surrounding area as well.

25. Ibn Balkhi "Fars-Nama" ed. le Strange, G. and Nicholson, R.A. Gibb Memorial Series, London, Leyden, 1921. quoted in. Clarke, J.I. "The Iranian City of Shiraz", Department of Geography, University of Durham, Research Series No.7. 1963.p.13.

26. Yate, Lt.Col. "Khurasan and Sistan" London, 1900, p.332.

Notes to Text and references

27. A.L. Mugubumje "Urbanization in Nigeria; A Constraint on Economic Development". J.Ec.Dev. and Cult. Change, vol.XII, 4, 1, July, 1965.

28. International Labour Office "Why labor leaves the land, a comparative study of the movement of labour out of Agriculture". Studies and Reports. New Series, 59, Geneva, 1960, p.209.

Quoted in Sovani, op.cit. p.119

29. Janet L. Abu-Lughod, op.cit. p.315, footnote 11.

30. UNESCO, "Demographic Aspects of Urbanization in the ECAFE region" op.cit.p.101.

31. Hoselitz, B.F. "Urbanization and Economic Growth in Asia" J. Ec. Dev. and Cult.Change. Vol.VI, 1.Oct.1957.p.44.

32. Hoselitz, B.F. "Sociological Aspects of Economic Growth" (a collection of the author's main papers). Glencoe, Ill.1960.

33. Hoselitz, B.F. "Social Structure and Economic Growth" Economia Internazionale Vol.6.3, Aug.1963. Reprinted in Hoselitz, B.F. "Sociological Aspects of Economic Growth" op.cit.chap.2, p.24.

34. ibid, p.25

35. ibid, p.26

PART I - Background

2. The Setting

3. Historical Introduction

4. Development in the recent past

2. THE SETTING

Introduction

1. Site

2. The Climate

3. Agriculture

4. Historical and Cultural influences

5. Religion

6. Summary

Mashhad is located in the north-east of Iran close to the Soviet and Afghan borders, and is the capital of the Ostan (province) of Khorasan.[1] The city is situated at about 3,000 feet, at the eastern end of a fault-bounded tectonic depression filled with quarternary sediments and drained by the Atrek Rud[2] to the west (into the Caspian) and by the Kashaf Rud to the east. This corridor-like depression separates two branches of a fold mountain system, known as the Elburz.

The southern branch of this mountain system named the Kuh-i-Aleh and Kuh-i-Binalud[3], is composed of Mesozoic limestones and igneous rocks and rises to 10,000 feet, whilst the northern branch, the Kuh-i-Hesar Masjid[4] built mainly of cretaceous limestones, slopes west-east from 10,000 feet to 6,000 feet. This latter range separates the Atrek-Kashaf corridor from the steppes of Central Asia to the north, and it is along its north-facing flanks that the Soviet border is aligned. To the south and west of the Kuh-i-Aleh, the Jajarm-Isfarain basin forms the other main lowland area of northern Khorasan. (Figs.1 and 2)

South of this fold mountain area stretches the central plateau of Iran over which are developed the deserts of the Kavir[5] and the Southern Lut[6] occupying over two-thirds of the province of Khorasan. The eastern edge of this desert plateau is bounded by a low range of mountains running north-south, forming the boundary between Iran and Afghanistan.

MASHHAD – LOCATION IN RELATION TO THE OLD SILK ROAD AND MEDIAEVAL ROUTES ACROSS CENTRAL ASIA.

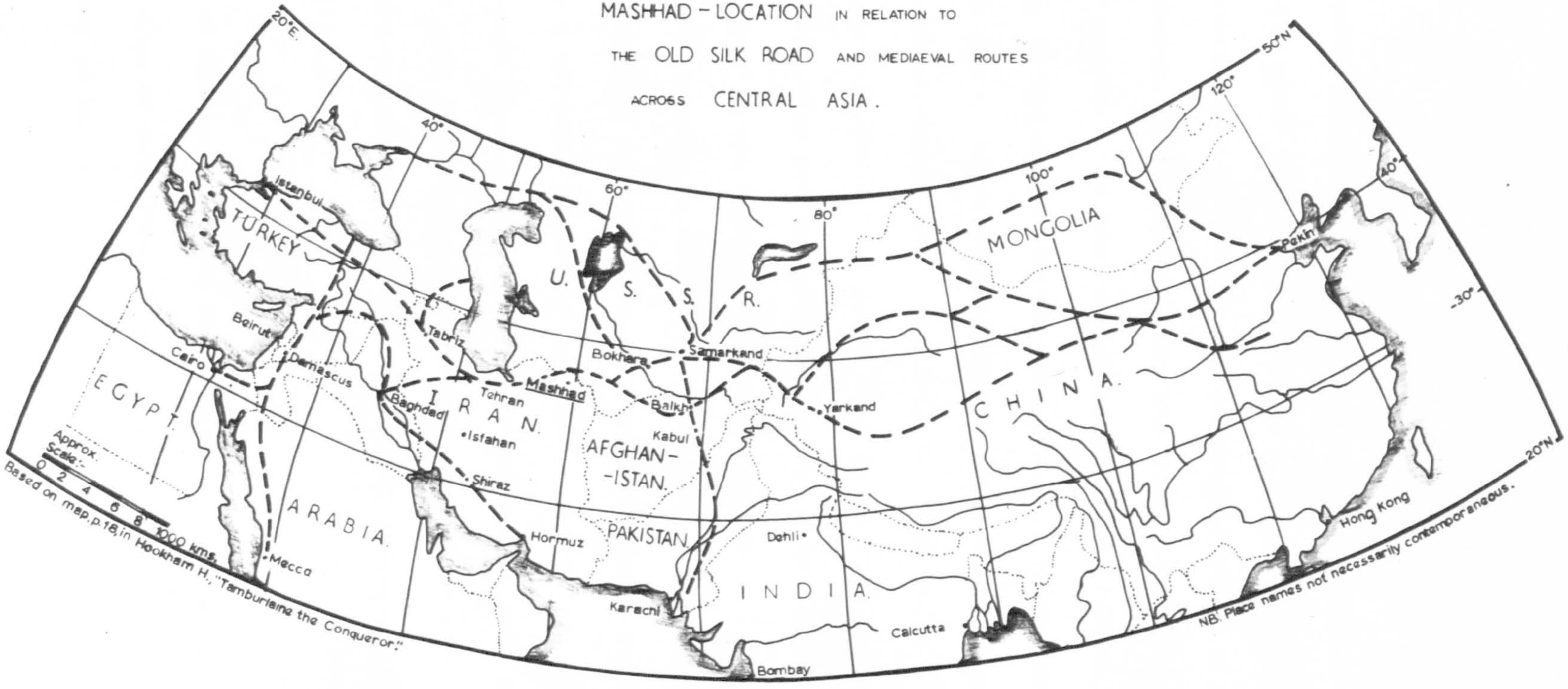


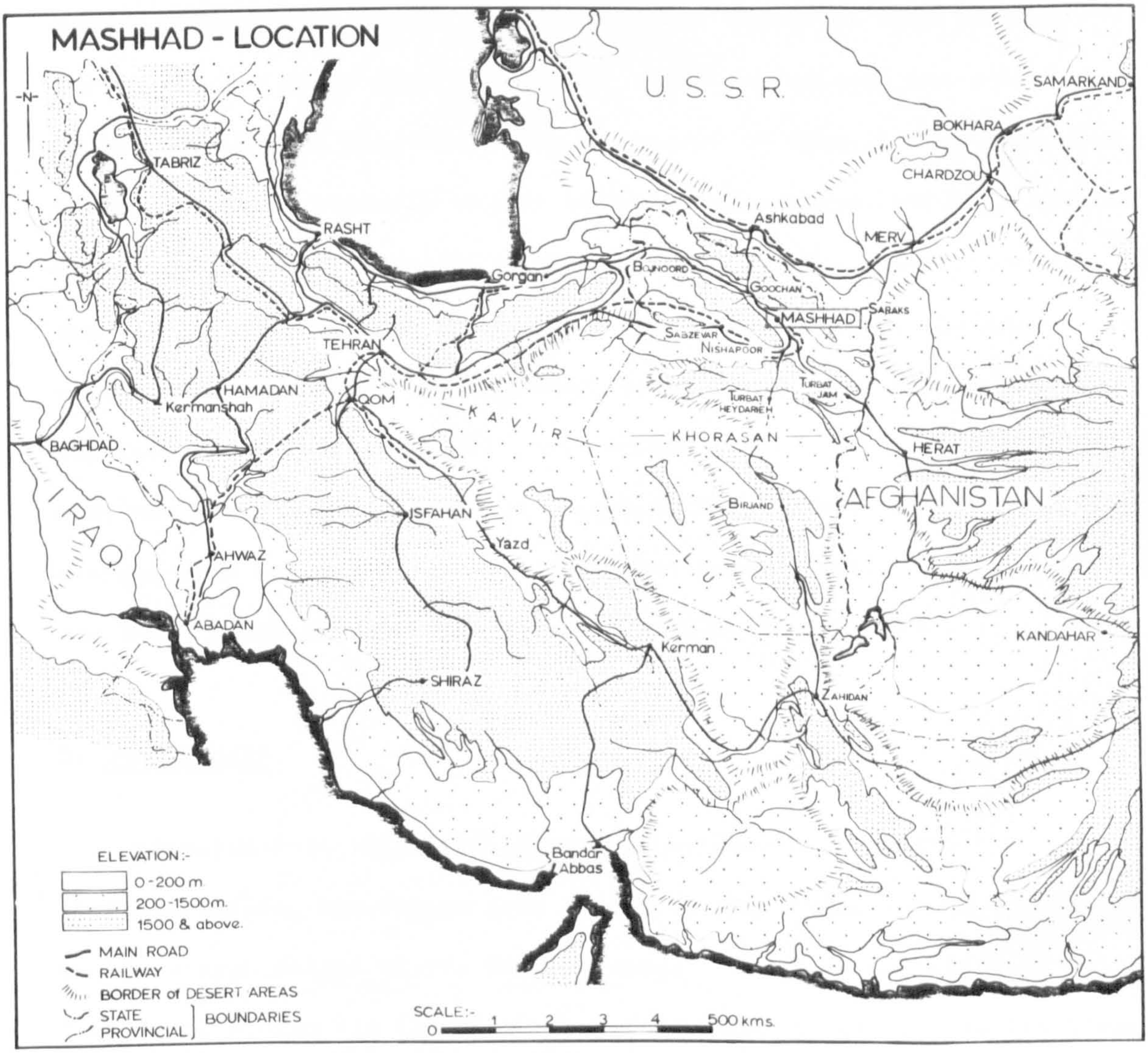
Fig. 1.

1. SITE

Mashhad's position was determined not by physical factors but by the fact that it was the place of the martyrdom of a Shia' Imam (saint) and the shrine erected subsequently became one of the chief centres of Shia-Muslim pilgrimage.[7] However, given this origin, the site has influenced the town's subsequent growth. In common with many Iranian cities, for example Tehran and Shiraz, it has grown towards, and parallel to the nearby mountain front, in this case the northern edge of the Kuh-i-Binalud which forms the south wall of the Atrek-Kashaf corridor. (Fig.3) The chief reason for this direction of growth would seem to be that in an arid environment a controlling factor of city growth is the extent to which large and reliable quantities of fresh water can be made available. Under conditions of arid or semi-arid erosion, a mountain front such as the Kuh-i-Binalud tends to retreat parallel to itself leaving behind a large talus of detritus which is a valuable reservoir of underground water, since it collects the drainage running off the steeper bed-rock slopes behind. Indeed throughout arid Iran, life depends on the use of these reserves of water, which are tapped by means of a system of underground tunnels, known as qanats (Fig.3)

In the case of Mashhad the city has tended to grow up this gently sloping piedmont area of detritus. In the past it was the practice for each house or group of houses to have its own well or qanat system. Thus

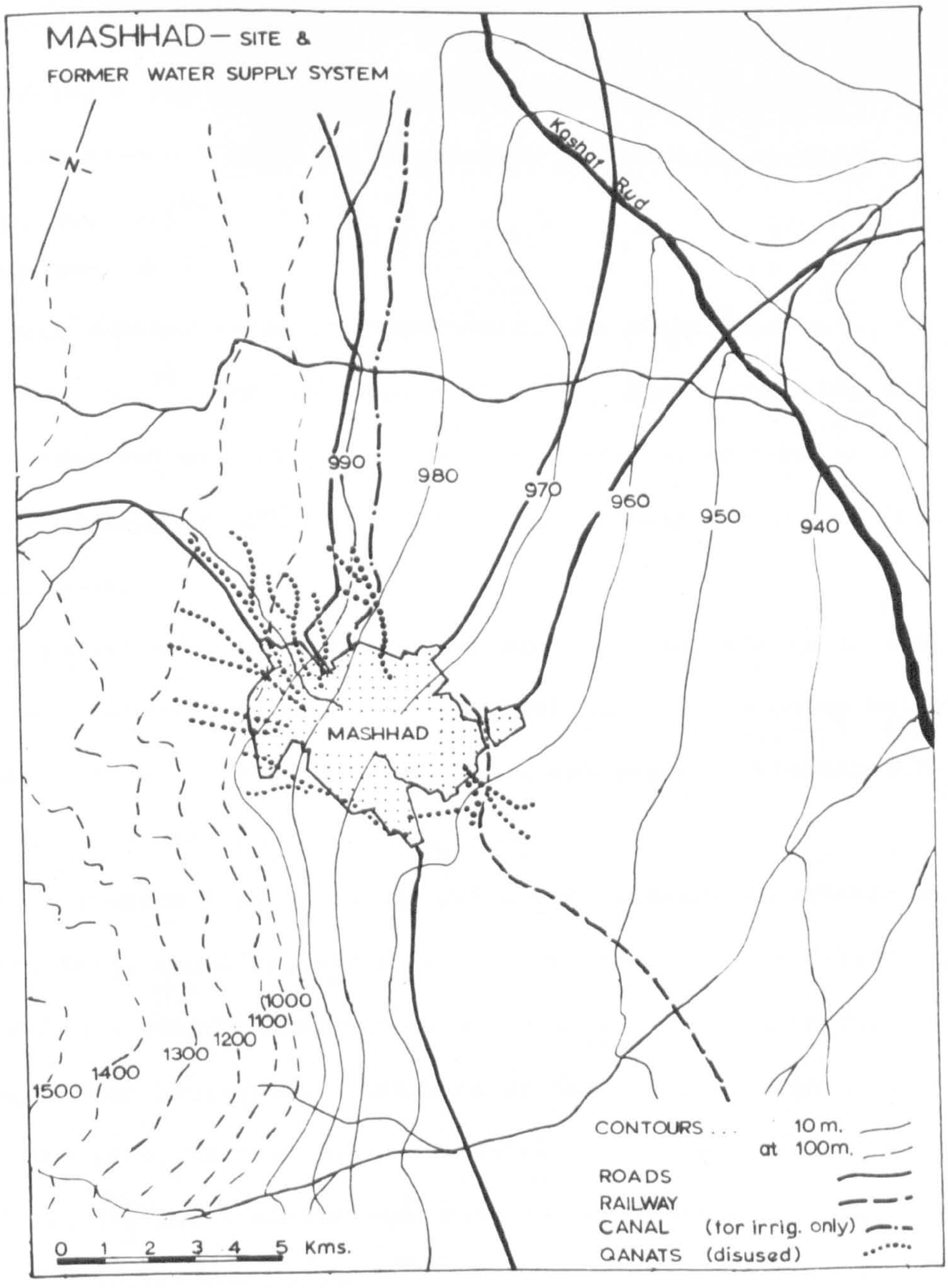
Fig. 2.

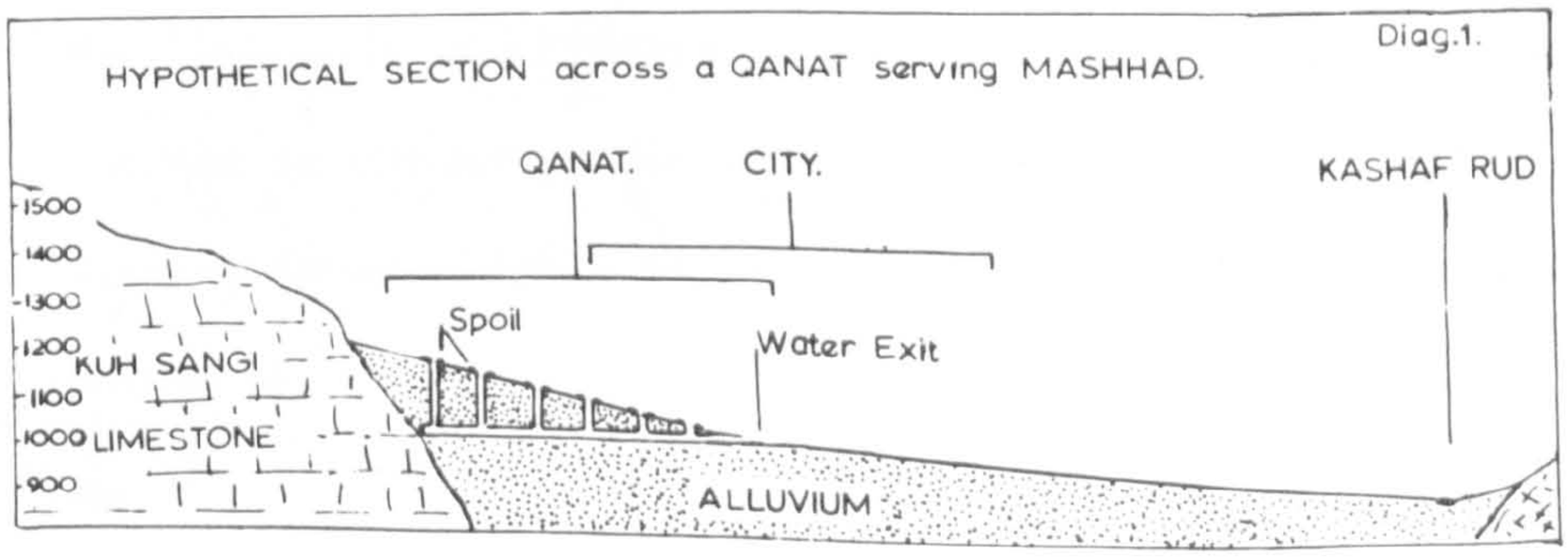

MASHHAD - LOCATION
N
U.S.S.R.
SAMARKAND
BOKHARA
CHARDZOU
TABRIZ
RASHT
Ashkabad
MERV
Gorgan
BOJNOORD
GOOCHAN
SARAKS
MASHHAD
SABZEVAR
NISHAPOOR
TEHRAN
HAMADAN
Kermanshah
QOM
KAVIR
TURBAT JAM
TURBAT HEYDARIEH
KHORASAN
HERAT
BAGHDAD
IRAQ
BIRJAND
AFGHANISTAN
ISFAHAN
Yazd
AHWAZ
ABADAN
Kerman
KANDAHAR
SHIRAZ
ZAHIDAN
Bandar Abbas
ELEVATION:-
0-200 m.
200-1500m.
1500 & above.
MAIN ROAD
RAILWAY
BORDER of DESERT AREAS
STATE
PROVINCIAL
BOUNDARIES
SCALE:-
0
1
2
3
4
500 kms.

the house located furthest up the slope would receive its water pure, passing it on, somewhat contaminated, to houses further down the slope. Houses added to the margin of the city were therefore best located further up the slope than all others, andin consequence the city has slowly expanded in this direction. Because of this, little expansion took place until recently in the down-slope direction, which is towards the Kashaf Rud, about four miles north-east of the city. Today however, with the availability of deep wells and a piped water system, the advantages of an up-slope location have been removed, since fresh water can be made available equally well to all parts of the city. This, plus the fact that the city has now reached the abrupt change of slope where the mountain front emerges from the detritus, has meant that more recently some expansion has taken place in other directions, to the north and east.

2. THE CLIMATE

Situated well inland, Khorasan has a climate dominated by continental characteristics, and ranges from desert in the south, through semi-desert to the steppe regime of the Mashhad area. However, the altitude (3104 feet), and access via the Atrek Kashaf corridor to winds from the Caspian Sea moderate the extremes normally associated with the Iranian interior, and Mashhad is generally recognised within Iran for the 'temperate' nature of its climate. For the purposes of this work however, climatic details


MASHHAD — SITE &
FORMER WATER SUPPLY SYSTEM
N
Kashaf Rud
990
980
970
960
950
940
MASHHAD
1000
1100
1200
1300
1400
1500
0 1 2 3 4 5 Kms.
CONTOURS ... 10 m.
at 100m.
ROADS
RAILWAY
CANAL (for irrig. only)
QANATS (disused)


Diag.1.
HYPOTHETICAL SECTION across a QANAT serving MASHHAD.
QANAT.
CITY.
KASHAF RUD
1500
1400
1300
1200
1100
1000
900
KUH SANGI
LIMESTONE
Spoil
Water Exit
ALLUVIUM

are not of major importance and can be summarised as follows:-[8]

(i) a wide seasonal range of temperature tempered by altitude

Jan. mean 2.9^{oC}

Aug. mean 26.2^{oC}

(ii) a wide diurnal range of temperature, the mean range being for August 16.1^{oC}, and for January 12.5^{oC}. Associated with this are frequent periods of extreme temperatures, as much as a mean minimum of -20^{oC} in February, and a mean maximum of 38.4^{oC} in August.

(iii) low relative humidity during the day time, especially in the summer months, the mean for June, July and August being below 25%. This is often coupled with a hot dry wind blowing into the desert areas.

(iv) precipitation from 5" to 12" per annum, intensely variable in frequency, quantity, and time of occurrence, - some falling as snow in winter. Precipitation is rarely recorded in July, August and September. The bulk of the rain falls in 30-40 days of the year, half of which are normally in the month of March, during the short spring when rain is precipitated in the form of torrential downpours.

Aridity is thus the most significant element in the climate. Thus 'qanat' irrigation is mandatory for permanent and reliable farming, whilst the qanats themselves are highly vulnerable to the sudden spring rainfall. Due to high rates of run-off, a product of hard baked soil and the generally degraded state of the vegetation cover, the tunnels cannot

deal with the sudden increase in flow and collapse is common. Large ditches known as khandag are necessary as flood protection for the city and indeed the old wall and ditch served a double defence purpose against attack and flood. Remains of three semi-circumferential khandag are visible, but the most recent (15 metres x 30 metres), situated parallel to the mountain front in an attempt to arrest sheet run-off, is still insufficient to prevent extensive flooding at least once a year, as for example during the spring of 1963 when a number of deaths from drowning were recorded, (Fig. 4). This danger of flash flooding is amplified by the old type of town house still common in Mashhad as in other Iranian cities; built on a courtyard system out of mud or mud-brick usually below street level and possessing a basement room as protection from summer heat, this type of house is particularly vulnerable to undermining and collapse, (Fig.7).

3. AGRICULTURE

This is the dominant activity in Iran, and 59.5% of Khorasan's employed population is occupied in agriculture, fully or partially. Agricultural activities reflect the nature of the climate, and it is the availability of water which is the main limiting factor in cultivation. Dry farming on daym land is little practised, since it is an economic speculation marginal in this area due to the unreliability of precipitation, - thus most cultivation is (almost by definition) irrigated.

The Atrek-Kashaf corridor has traditionally been one of Iran's chief

grain producers (barley and wheat) and grains are still prominant in the economy. But sugar beet production with its associated refineries is fast replacing grain in the area as the mainstay on which economic development rests. Traditionally also an area of nomad and semi-nomad, Khorasan still has many head of sheep and goats and some cattle, especially in the south and in the area north of the Atrek-Kashaf corridor. The livestock industry though significant in the economy, is, however, in a much degraded state due to the discouraging official policy towards nomadism, and the lack of range-management techniques.

With its great number of hours of sunshine and its long summer, Khorasan has a climate well suited to fruit production and orchards of temperate and Mediterranean types of fruit are common, though inefficient and unproductive due to lack of knowledge and/or interest. Indeed the garden of bagh in Iran was viewed not as a means of production but as a place of relaxation in the shade and near water, production often being of secondary importance. The region is famous for the wide variety and high quality of its melons, which are a commercial crop.

In general however, outside the Atrek-Kashaf corridor and the Jajarm basin in the west, cultivation and settlement occur only in those isolated spots where water is close to the surface and has been developed as a resource. Permanent settlement occurs only as an interruption to

grain producers (barley and wheat) and grains are still prominant in the economy. But sugar beet production with its associated refineries is fast replacing grain in the area as the mainstay on which economic development rests. Traditionally also an area of nomad and semi-nomad, Khorasan still has many head of sheep and goats and some cattle, especially in the south and in the area north of the Atrek-Kashaf corridor. The livestock industry though significant in the economy, is, however, in a much degraded state due to the discouraging official policy towards nomadism, and the lack of range-management techniques.

With its great number of hours of sunshine and its long summer, Khorasan has a climate well suited to fruit production and orchards of temperate and Mediterranean types of fruit are common, though inefficient and unproductive due to lack of knowledge and/or interest. Indeed the garden of bagh in Iran was viewed not as a means of production but as a place of relaxation in the shade and near water, production often being of secondary importance. The region is famous for the wide variety and high quality of its melons, which are a commercial crop.

In general however, outside the Atrek-Kashaf corridor and the Jajarm basin in the west, cultivation and settlement occur only in those isolated spots where water is close to the surface and has been developed as a resource. Permanent settlement occurs only as an interruption to

Fig. 4.


MASHHAD – SITE.
CONTOURS at ONE METRE
& MAIN LINES of FLOOD DRAINAGE
962
964
966
968
970
972
974
976
978
980
982
984
986
988
990
992
994
996
998
1000
1002
1004
1006
1008
1010
1012
KUH — SANGI
SCALE :-
0 500 1000 1500 METRES
MAIN FLOOD DRAINAGE LINES
FLOODED AREAS, SPRING 1963
RAILWAY-
BASE – MAIN STREETS AND BUILT-UP AREA.

a vast area of unimproved desert or semi-desert, the most efficient usage of which appears to be extensive livestock farming. The symbiotic relationship which in theory exists between a city and its region would appear in Khorasan to be biased towards the city (Mashhad) which receives goods but performs few regional services. The zoning of agricultural activity around the city, however, seems to conform to standard economic generalisations on the location of activities in terms of 'inputs' in relation to the value and the cost of transport of the product. Thus fruit, vines and vegetables are in gardens in the city of Mashhad and these are replaced with distance from the city by melon cultivation, then sugar-beet and grains, and finally livestock farming. The boundaries between these zones are, however, somewhat indistinct.

4. HISTORICAL AND CULTURAL INFLUENCES

Mashhad has in the past been separated by the central deserts from the main axis of Persian life in Tehran, Isfahan and Shiraz, with which communication was difficult and dangerous. Consequently in the geographical, cultural and historical senses the city today has perhaps more in common with its Central Asian neighbours such as Ashkabad, Merv, Samarkand and Bokhara in the north, or Herat and Kabul in the east (located only similar distances away) than it has with the main Iranian cities. Repeated invasion from the north and east has largely dominated Mashhad's history, whilst difficulties of communication to the west have contributed to Khorasan's physical and cultural isolation from the rest of Iran.

It is true that the northern range of mountains, the Kuh-i-Hesar-Masjid does separate Khorasan and the Atrek-Kashaf corridor from the steppes of Central Asia to the north. However, this range is not high and it was through passes in it that the Great Silk Road passed through northern Khorasan, connecting Pekin and India in the east to Baghdad, the Levant and Istanbul, and ultimately the whole of Europe in the west (Fig.1). Much of Khorasan's character is a reflection of its critical position in a zone of political instability between nomad in the north and settled agriculturalist in the south, through which this important routeway had to pass. Consequently Khorasan has been a march land for many centuries with a continuous history of invasion and conquest.

In the 16th and 17th centuries the Great Silk Road declined in importance as trade with India became sea-borne and the sailing route around Africa was established. Later, during the 18th and 19th centuries with the opening of the Suez canal making trade by sea even more advantageous, and with the closure of the Russian border to the north, the strategic importance of northern Khorasan was removed.

Because of this, Mashhad is today capital of a cul-de-sac enclosed on the north by the Soviet frontier, and on the south and east by vast areas of desert. Into this cul-de-sac run two routes, one along the desert margin south of the Kuh-i-Aleh and Kuh-i-Binalud, carrying road and rail connections via Sabzevar and Nishapoor to Tehran, and the other

carrying a road via the Atrek-Kashaf corridor, and the Caspian shore, also to Tehran (Fig.2). The route from the south along the eastern desert margin, and the route east to Herat and Afghanistan have had only local importance for some time. They were however revived during 1963 when the Afghanistan-Pakistan dispute closed Pakistan and Karachi to Afghan trade and many of Afghanistan's imports were coming from Badar Abbas on the Persian Gulf, to Mashhad and then via Herat to Kabul.

5. RELIGION

It is to the beliefs of the Shia' religion that Mashhad owes its origins, and being Iran's national religion it has been decisive in the city's growth and later development. In 809 A.D. the 8th descendant of Ali, nephew of Muhammad, successor to the prophet in Shia' eyes, was killed and buried in a garden south-east of the city of Tus, which was the capital of the Kashaf-Atrek corridor area at this time. The spot became known as Mashhad-al-Rida, "the witness of martyrdom". Pious veneration through subsequent centuries was based partially on the obligation of Shia' muslims to partake during their life-time in at least one pilgrimage to a Holy Place such as this, and also on the belief that on death it is advantageous to be buried close to a holy personage. This led to the construction of a shrine, mosques and religious colleges, and graveyards which became the nucleus of the city of Mashhad. (Frontispiece)

As in Mecca, a Harram or 'Holy Quarter' grew up and increased in wealth through continued endowments of land, and gifts of valuables. Today the Ostanegots (the shrine administration), headed by a government appointee who combines this office with that of Governor-General, is itself a rich and powerful landowner, venerated by the majority of 20,000,000 Shia' muslims. This 'state-within-a-state' which dispenses most of its large income in the form of hospitals, clinics, schools and religious colleges, is in part responsible for the feeling of independence from the rest of Iran, which is common in Khorasan. The existing physical, historical and cultural isolation, which in any case tends to [illegible] Khorasan from Iran is thus emphasised by the power of the religious organisation of the shrine.

Holding as waqf[9] wholly or partially 241 out of the 730 villages both in Khorasan and elsewhere in Iran, the Shrine's power rests on a strong economic base. But despite this, perhaps its greatest influence is in its hold over the people and the way in which the majority of uneducated Iranians are guided largely by what is preached in the mosques each day, whether this be religion or politics. With about 800 mullahs and 5,000 students attached, the shrine forms a large-scale centre of religious education, and its employment roll extends to thousands of administrators, bailiffs and others, forming a significant proportion of the employment structure of Khorasan.

The influence which religion has in society is changing, but is

difficult to assess. Whilst religion clearly maintains its sway over the rural population, members of at least the higher echelons of the urban community, with increased opportunities of secular education, and general experience of the world outside, are now less guided by religious authoritarianism and dogma. However, within the structure of the Shrine organisation a reaction is crystallising against modern influences and particularly those associated with the West. The physical expression of this reaction can be seen in the erection of a new (outer) set of gates to the Harram during 1964, protecting this holy centre from the more easily identifiable carriers of these modern influences that is, non-muslims, particularly Westerners. The Shrine of the 8th Imam was until recently the economic raison d'etre of the city, built on twin pillars, - investment in land and agriculture and the pilgrim traffic. This power is adequately symbolised for the mass of people in the fanaticism and jealousy with which the gold-plated buildings and wealth of the Harram are guarded from non-muslim eyes.

The power of the Shrine and its leaders is a grave embarassment to the central government, which finds itself obliged to maintain troops in the city and the provinces and sometimes causes it to be partially opposed to its own state religion. Concern over the first phase of land reform expressed by the religious leaders in 1963 is now growing into bitter opposition as phase two, the reformation of the waqf land, begins (October 1964). If phase two is successful, the continued power

and influence of the Shrine will depend on the extent to which it is based not on economic foundations but on religious authority and continued veneration by the population.

6. SUMMARY

This introduction is offered as a guide to the main influences physical and others, which have contributed to the development of the city and its present situation. The factors which are behind the isolated nature of the province and the city are reviewed, and the power of the Shrine, on which much of the city's development has depended, is discussed. This is the setting in which must be placed the social and economic structure of the present city and the nature of the city's response to modernising influences with which the thesis is concerned.

Notes to Text, and references

1. Mashhad, variously spelt Mashad, Meshed, Mesched, and Mashhad. The latter is selected as being nearest the local pronunciation, and is the form used by the U.N.

2. Rud = river. N.B. Persian words are underlined in the text on their first appearance only. A glossary is provided.

3. Kuh = mountain, hill

4. Hesar = thousand; Masjid = mosque

5. Kavir = salt desert

6. Lut = group of salt basins

7. The muslim world is divided into two main parts; the Sunni believe in the succession of the Caliphate after Muhammad, the Shia' a minority restricted to Iran, Pakistan and some parts of Iraq and Turkey, believe that the rightful descendents of Muhammad are the successors of his nephew, Ali. The successors are known as Imams (saints)

8. Statistics from the Metreological Yearbook of Iran 1959 and the Iranian Metreological Department ,Tehran 1962.

9. Waqf = land, the control and income of which is endowed to the Shrine by a landowner.

10. Mullah = priest, cleric

3. HISTORICAL INFLUENCES

1. Early History
2. The Muslim conquest
3. The origin of Mashhad
4. The Mongol cataclysm
5. Post-Mongol history
6. The Afghan invasions and rise of Nadir Shah
7. The Zand and Kadjar dynasties
8. The Twentieth Century
9. Summary

Historical factors have played an important part in the development of the city of Mashhad, and some consideration of the main trends is essential to an understanding of the social and economic structure of the city today.

1. THE EARLY HISTORY

The early history of Khorasan is obscure, though we know that it was, in Parthian times, much larger than at present, embracing much of what is now Soviet Central Asia, Western Afghanistan, and Sistan, in the south[1]. At an early date Khorasan was little affected by events to the west in Isfahan and Shiraz and led an independent, though rarely integrated existence of its own, acting as a 'buffer' area hotly disputed between the nomads of Central Asia (Turkestan) and the settled people of the south. Yet even at this stage the 'frontier' nature of the area was established, insecurity being its dominant characteristic, relative not to any resources or riches of the region itself, but to its special position astride the well-marked trade routes from east to west, later becoming the 'silk' road.

Details of the position of these routes are obscure, but both Stratil-Sauer,[2] and Hookham[3] deal with them. The intensity with which any of the six or seven possible routes through the Elburz mountains was used must have varied from time to time, but six main ones seem to be evident,[4] the result of trade, migration, and invasion and movement

generally between Central Asia, China, the Middle East and Europe. Whilst the great empires of Assyria, the Medes and the Achaemenids (553-331 B.C.) who ruled from Persepolis and Ecbatana (near present Isfahan) flourished in the west, the eastern province of Parthia remained relatively obscure; and Khorasan's independent nature today may well have its roots in this early politico-cultural separation. Alexander the Great united eastern and western Persia to some extent, and in pursuit of Darius, took Tus, the capital of a province of Parthia at this period, situated 14 miles N.W. of present Mashhad and functionally its forerunner. His successors, the Seleucids and Arcasids based on Hecatompylos, the present Damghan, brought stability to the area, during which time trade flourished along the routes connecting Athens and Rome to Parthia, China and India, most of which passed through Khorasan. The Sassanids (224-640 A.D.) despite intermittent warfare, were also able to maintain trade along the Silk Road, and trading cities began to grow up at critical points along it.

2. THE MUSLIM CONQUEST

It is not until the advent of the Muslims in Persia, that sources became more plentiful, when the great Arab geographers - al Mukudassi, ibn Hawkal, ibn Batutha, Yakut, and others were writing. Beginning in 637 A.D. in the extreme west, the conquest had by 705 - 715 A.D. reached the Oxus and Jaxartes - as far as Khiva and Ferghana, including the whole of Khorasan. Under the Omayyid Caliphate 661 - 750 A.D. the gradual

'arabisation' and conversion to Muslim faith in Persia, was 'most extensive in Khorasan'[5] where all muslims, arabs or not, were made free of land tax, and at the official level at least, there existed little discrimination between the Arab and local muslim - an unusual state of affairs.

However, even at this date, the Shia' heresy was beginning to grow away from orthodox Sunni Islam, centring its belief in the descendants of Mohammad's nephew Ali, as the Imam's of the muslim faith, opposed to the Medina appointed Caliphs. Indeed it is to the growth of this heresy in this remote and less orthodox province of the muslim empire that Mashhad owes its origin.

Khorasan at this time was fully a muslim, though not an arab province and was divided into four quarters, Herat, Merv, Balkh and Nishapoor, each centred on the city of that name , with Nishapoor as capital of the whole province. The Sistan and Qa'aenat areas of the south were excluded from this unit. The Nishapoor quarter corresponded roughly to present Khorasan, and the city itself was, according to various and sometimes exaggerated arab sources, of great size, before its reduction by earthquake, conquest and re-conquest. Raw and manufactured cotton, and silk goods are mentioned amongst its exports[6]. Other cities in the quarter at this time included Jajarm, Sabzevar, Goochan, and Tus, the latter being the mediaeval forerunner of Mashhad.

Tus (birthplace of Firdausi), 15 miles N.W. of present Mashhad, has obscure origins. The name Tus was originally given to a group of villages and small towns, chief of which were Nowkan and Tabaran,[7] but Arab geographers, interested in the capital Nishapoor, confuse the situation and contradict each other. It may however have been pre-Sassanid. With the advent of the Arabs in Khorasan, both Nishapoor and Tus were spared, on payment of a forfeit but Tus 'played no independent part in Arab Rule'[8].

3. THE ORIGIN OF MASHHAD

In A.H. 193 (A.D. 809) Harun-al-Rashid, one of the Arab Caliphs, on his way to Samarkand to put down a local rebellion,[9] died in Tus and was buried in the garden of Sanabad, a village near Nowkan, 15 miles S.E. of Tus. Shortly after this in A.H.203 (A.D.818) the 8th Imam, 'Alid 'Ali ibn Musa-al-Riza (Ali-Reza) also passing east on the Silk Road, died, or was poisoned, and he too was buried in the Sanabad garden of Nowkan.

From this date, Mashhad can be said to have originated, for Ali-Reza was already venerated by a Shia' minority, being a descendant (the 8th) of Ali, nephew of Mohammad. However, Shiism was not yet powerful, and for some time there was no development in Nowkan, whilst Tus was still local capital. By 278 A.H. (A.D.891) however, Nowkan had apparently replaced Tabaran.[10]

By 985,[12] Tabaran was a small town of little importance and Nowkan had been swamped in the growth of a new town around the finest mosque in Khorasan, erected at the side of the 8th Iman's shrine. This new town became known as 'Mashhad' and was complete with houses, a market, and a citadel by this date.[13]

However, in 999 A.D. came the first of many invasions to Khorasan - by the Ghaznavids of W. Afghanistan, who laid waste the cities and countryside - including Tabaran and Mashhad. Shortly afterwards the Samanids retook the same area, only to be followed by the Khura-Khanids of the North. Each time life was interrupted, trade ceased, and most settlements were destroyed. The mosque at Mashhad was however rebuilt by the Samanids, and steps were taken towards protecting and encouraging pilgrims to Mashhad,[14] insuring the survival of the city despite repeated destruction.

Turkic tribes now began to cross the Oxus, many south into Persia - not as an organised army, but in the manner of migration with swift and ppwerful raiding parties. At first Khorasan suffered very few raids, and the tribes were gradually being absorbed into local society. However, they were Sunni in belief, and friction was inevitable. In A.H.510 riots broke out in Mashhad, and Sunni Turks laid seige to the city, destroying much of it.[15]

Despite the building of Mashhad's first wall in A.H.515 (1037 A.D.) another horde, the Ghuzz, invaded, passing through the Kashad Rud Valley and laying waste settlements in it, sparing only the Harram in Mashhad.

Once again Mashhad's religious significance both to Sunni and Shia' proved stronger than its physical defences in assuring its continued existence, whilst at the same time the capital, Nishapoor, only recently rebuilt after an earthquake, was so thoroughly destroyed and massacred that complete rebuilding on a new site was necessary. In 1441 A.D. the Seljuks were ousted by the Khvarizm Shahs and later by the Guzz again, Tus and Mashhad both being sacked in 597 A.D., and whilst Tus was further reduced, Mashhad continued to survive because of its religious importance.

4. THE MONGOL CATACLYSM 1220 - 1500 A.D.

The Ghuzz visitations in all their destructiveness were merely tribal migrations, the forerunners of the invasion of a vast, organised Mongol army, a planned conquest in which everything was destroyed and life in Khorasan changed permanently. The hordes of Gengiz Khan, ill-adapted to, and caring little for settled forms of life, especially cities, were thorough in their destruction of them.

In the short period 1210 - 21 A.D. Bokhara, Balkh, Merv, Nishapoor, and many other cities including Tus and Mashhad were laid waste, and their population slaughtered, by the generals of Gengiz Khan.[16] By the end of 1221 A.D. Khorasan was severely depopulated, for those who had not fled were slain.

Some rebuilding took place in the following few years and the Christian

community throve, since Mongol and Christian were united in their common hatred of the Muslim. The later visits of Marco Polo and Clavijo to the Mongol court were a continuation of this. For 90 years after the death of Gengiz Khan however, there was a period of broken rule, as his ex-generals claimed various parts of the empire and sought to defend their claims, each from another. Instability and almost continuous warfare ensued.

But then Tamburlaine the Great led the hordes south again - having first seized power in Central Asia he began the invasion of Persia, the brunt of which was again borne by Khorasan. Tamburlaine continued the systematic destruction of urban centres, and massacre of their inhabitants, (70,000 were killed in Isfahan for example; 80,000 in Delhi). Nishapoor was levelled to the ground so thoroughly that today even deep digging reveals little of the old city - few of its inhabitants survived.

The end of Tus came in 1389 A.D. when Miranshah, Tamberlaine's son, sacked it and killed all but a few of its 10,000 inhabitants. But by this time, Mashhad was well established and replaced Tus functionally as the economic and administrative capital of the Kashaf Rud valley. The end of Tus was sealed shortly afterwards when its water supply (from a spring), the Cheshme Gilas was diverted to Mashhad, through the main streets of which it still flows. This, plus the fact that the shrine had been rebuilt in 1304-16 A.D. by a pious member of Tamburlaine's staff, ensured for Mashhad an unusually quick recovery from the 100 years of continuous warfare that had assailed it.

5. POST MONGOL HISTORY

Tamburlaine's son Shah Rukh, was noted for his munificence and, uniting to some extent the other sons under him, repaired much of the damage done by his father. His wife Goharshad erected in the period 1404-16 A.D. a mosque in her name, which today still dominates the holy quarter of Mashhad, and Shah Rukh himself contributed land, treasure and books to the shrine whose growth in power, land ownership, and political influence dates from this period. After Shah Rukh's death however, Khorasan was plunged into its more 'normal' state of warfare when Uzbeg hordes, again coming from the north, siezed the area, but only ineffectively, so that a langorous campaign between East and West continued through the 14th century, at the end of which a famine of unusual severity, brought on by continued economic inactivity and political instability, further reduced the population.[17]

Towards mid-century however the dynasty in the west, the Safavids under Ismail I, eventually 'liberated' Khorasan and Mashhad from the Uzbegs, but equally contributed to the destruction of the city. Under Ismail I, Shia Islam became the official 'state' religion, distinguishing Persia from the rest of the Muslim world and manifesting the very different culture underlying Persian life. Encouragement was therefore given to pilgrims to visit Mashhad and Qom (S. of Tehran) as well as the'more holy' centres of Nejev and Kerbala, in Iraq.

Tahmasp I, succeeding Ismail I, continued this policy, making Mashhad his capital, and contributing to its economic well-being by establishing his court in the city, with all its demands for buildings, defences and luxuries. But even then, Mashhad's importance was still merely regional. Ismail II, who followed Tahmasp I in 1567 A.D., demonstrated that instability was never far from the area, since as a result of weakness petty dynastic squabbling arose yet again. However about this time, Abbas, one of these 'squabblers' had siezed power, and making himself indispensable to the state, became the Great Shah Abbas I in 1587 A.D., at Mashhad.

6. SHAH ABBAS I

Abbas made Mashhad his capital but unlike his predecessor Ismail I, it became a national, not merely a regional centre, for Abbas' influence spread all through Persia to Isfahan, Shiraz, and the west. Resident in Mashhad from 1587-9 only, he too encouraged the Shia' religion and pilgrimage, so that the city grew in population, and a period of peace allowed the opening of the caravan routes, with safety more or less assured by the state.

Concern over the huge western frontier was a factor behind Abbas' decision to move to Isfahan after only two years in Mashhad, but despite the removal of the royal court there may not have been any significant decline in Mashhad's position, since none of the sources comment so.

On his departure, to ensure continued strength of the eastern frontier, Abbas' transferred to the area north of Mashhad and to the Atrek Valley a Kurdish tribe who were renowned for their power in warfare.

The great E-W. avenue Pain-Bala Khiaban running up to the Harram, is a legacy of Abbas' reign laid in 1601.[18] A wide 'Housemann' type boulevard with the city's water supply running down the centre in a canal, it was an early form of town planning which has to a large extent controlled the morphology of the city since. Caravanserai[19] multiplied along it, and there developed a uniform size of shop which exists now not only on this avenue but elsewhere in the town. This has greatly affected the morphology of the 'bazar' which as a physical entity represented by narrow domed-roofed alleyways of shops, has had no significant development, since at this early stage shops along the main street had the advantage of a higher customer-frequency and easier access.

Mashhad shared the general prosperity of Abbas' Persia, and this continued for almost 100 years after his death (up to 1700) whilst Persia grew progressively more weak politically at the hands of Abbas' successors in Isfahan. The east was once again becoming isolated, and invasions took place again.

7. THE AFGHAN INVASIONS 1709, and RISE OF NADIR SHAH

These invasions brought Safavid Persia to an end, and perhaps it is not coincidental that it was through the eastern province of Khorasan, made

progressively more remote and isolated by the inattention of Abbas' successors in Isfahan, that the end came. The Abdalis of Herat, and Ghilzais of Kandahar, both close to Mashhad, swept through Khorasan and destroyed much of the city before going on as far as the capital, Isfahan, where in 1722 Mahmud, leader of the Ghilzais, was declared Shah. Mahmud died soon afterwards however, and out of the chaos of central disorganisation and the split into component regions which is by now a readily identifiable pattern, it was yet again Khorasan which saw the birth of a new power, that of Nadir Quli, unwatched by central power in Isfahan.

Nadir Quli, who originated near Mashhad, and used the city as his base, was the last great warrior King of Persia who, after taking the capital Isfahan, became Nadir Shah and extended the frontiers of Persia to Iraq in the west, to Khiva and Bokhara in the north, and to Delhi in the east (treasures from which were used to enrich the Shrine at Mashhad, where both the Peacock Throne, and the Koh-i-noor diamond rested for some time).

Nadir Shah was a strong supporter of the Shia' religion, which along with the vast area of potential trade opened in the east, lifted Mashhad to heights it has only this century reattained. Like his great predecessor Abbas, Nadir gave perhaps the most valuable of all gifts to Mashhad and Khorasan, namely security and stability, conditions under which both commercial and pilgrim trades were able to flourish and long term investment in agriculture, in the form of qanats, was feasible. As

added protection, Nadir too transferred tribes, in his case Turkoman and Abdali, to this north-eastern frontier, incidentally further adding to the complex racial mixture of the area.

Under Nadir, Mashhad reached its peak and became his capital in about 1739, and one population estimate of 250,000 is on record[20] comparable to estimates a century earlier when Isfahan was by Chardin, quoted as having 600,000 people.[21] Mashhad did not attain this size again until 1958-9. The twin pillars of its economic prosperity - pilgrims and trade-at this time were reflected in the ninety caravanserai of the town and the growth of its religious colleges and foundations. The ruins of Abbas' and Nadir's caravanserai along the routes leading out of Mashhad, separated by distances of one day's march, are contemporary evidence of this great peak in the city's history. Nadir Shah was assassinated in 1747, and to a large extent Mashhad's greatness both as a seat of commerce and religious learning declined with him. The unfinished palace of Nadir was an ironic end to a period of brilliance.

8. THE ZAND AND KAJAR DYNASTIES 1747 - 1797 A.D.

After Nadir, strife for succession broke out all over Persia, and whilst Karim Zand took over the province of Fars in the south, leading its capital Shiraz to greatness, the east suffered an invasion of the Afghans (Abdali) yet again, and Khorasan and Baluchistan were annexed to an independent Abdali Kingdom. Mashhad was sacked in 1745[22] and Khorasan

was thus independent of Persia yet again. Mashhad was held by various members of the Kadjar family, but the city and even the shrine were plundered repeatedly, insecurity returned, and economic prosperity ceased - Mashhad had begun a long decline which lasted throughout the 18th century.

The succession of Fath Ali Shah in 1791 A.D. brought internal stability to Persia, but by this time Persia was becoming a prize sought after by the great powers of the world - Great Britain through Afghanistan, and Russia through the north province of Azerbaijan and the Caspian. Twice, after Russian wars over the annexation of Georgia, and after war against Afghanistan (which was backed by Great Britain) when central control was at its worst, Khorasan and Mashhad were the centre of uprisings. It was not until 1830 that Khorasan really became part of Persia again, when both Russian and Britain intervened using the local troubles as excuses. Even on the death of Muhammad and accession of Nasirud-Din Shah, a Kajar chief held Mashhad for some time (1848) before the citizens betrayed him to the Shah's troops who were laying seige. As late as 1889 misgovernment led to an abortive move for independence in Khorasan by the Kurds who had been transplanted to the area centuries earlier by Shah Abbas.

Most of these later uprisings are an expression of the lack of control which western and central authority, based on Isfahan, Shiraz, and later Tehran, has had over Khorasan. Repeatedly, local tribal leaders have been able to stir up the grass-rooted hybrid population into activity against the central power, playing on the feelings of 'separate identity' which even

today are strong in the province, and still pose problems for 20th. century centralised government.

The shaping of Persia's boundaries by Russian aggression in the north and the Caspian and by Great Britain's desire for an independent Afghanistan, were further factors in the separation of Khorasan from the rest of Persia and this particularly later in the nineteenth century.

9. THE TWENTIETH CENTURY

During the Constitutional Crisis of 1905-8, whilst all attention was being paid to Tehran and the precarious situation of the monarchy, Russian forces quietly entered Enzeli, Rasht, Tabriz, and Mashhad, a situation which the weakened central authority could do nothing but appeal to other foreign nations for help. Persia descended into the depths of insecurity again, despite the apparent monarchical 'weathering' of the crisis, and for some time even legally protected, part-motorized caravans were unsafe from local and tribal attack. The result was even more isolation, not just for Mashhad, but for many of the more distant provinces.

Russia , backing the ex-Shah Muhammad II, used a local rising in Mashhad led by a separatist, Yussef Khan, as an excuse to intervene on his behalf, and occupied the city, amongst others, in 1912, when the Shrine itself was bombarded.

Reza Shah, Oil, The New Order

Reza Khan, who rose rapidly to power in the early 20th century, and

was declared Shah of a new dynasty in 1925, dragged Iran through an economic and administrative revolution in his desire to 'modernise', an attempt which was only a partial success.

Reza Shah reconstructed almost all Iranian cities during his lifetime - laying out new boulevards, cut through both residential and commercial areas, and planning future ones to care for the growth of the towns. Mashhad shared in this general re-ordering, which has allowed motor-access and expansion on an otherwise impossible level, whilst contributing to the decline of power of the bazar in the old quarter of the city. Indeed one of the negative aspects of Reza Shah's policy was an attempt to control the forces which in the past had led to disunity - one of the chief being the well-integrated power of the bazar merchants, who in 1906 had had enough economic control of Iran to threaten paralysis. The guild system was infiltrated with government officials, whilst other aspects of centralised and much resented interference such as taxation, were used in an attempt to control it.

Perhaps Reza Shah's attacks on 'religious superstition' were felt more strongly in Mashhad, a seat of Shia' pilgrimage and learning, than elsewhere. Many mullah were shot dead, and anyone dabbling in politics became a suspect for treason. Mashhad's general resentment of this rough handling is still felt today, the chief opposition to 1962-4 Land Reform measures coming from the religious leaders of the Shrine, whose economic and political powers are threatened by them (the measures).

The increasing autocracy of Reza Shah's reign, which in the early stages meant so many permanent improvements, seems later in Mashhad to have led to stagnation, as this provincial capital is administered wholly from Tehran, where all decisions are taken. Official outlets for local leadership are therefore few, and so despite the weight of military strength in the city, disturbances continue.

But the beneficial effects of Reza Shah's policy are undeniable in the form of hospitals, clinics, measures to promote education, etc. Oil wealth little affected Mashhad directly until 1956, when a pipeline for the lighter products (paraffin and Kerosene) reached the city, along with the railway. Indirect effects in the form of reinvestment have been present, though not vast as yet. An oil-trade to Afghanistan has now been established.

10. SUMMARY

Throughout the history of Mashhad and its province Khorasan, there have been several main repeated patterns, partially an effect and partially a cause of its special position and significance. These may be listed as -

(i) The fact that Mashhad, situated on a frontier between the east and the west, has had a continuous history of invasion and recapture from both sides.

(ii) Due to this the region became a critical transfer area on the 'silk-roads' of Central Asia, connecting China and Inner Asia to

the western world and the 'Middle East'.

(iii) After Islam, the religious significance attached to the Shrine of the Imam Reza and the growth of the Shia' heresy into a national religion meant that despite repeated destruction of the city, the Shrine was almost always spared, so that Mashhad's 'raison d'etre' was never destroyed, and was a factor of sufficient weight to lead to a repeated rebuilding - even after the Mongol cataclysm, when other cities were abandoned or re-built elsewhere.

(iv) As a function of these three factors, the area has had a tradition of independence (in relation to Central Persian, and today Iranian authority). A region very much apart from the rest of Persia, it has many affinities with Central Asia, as well as with Iran and the Middle East.

(v) Lastly, as a result of repeated migrations, invasions, planned transplantations of tribes, and individual pilgrimages to this Shia' religious centre, there is a strong flavour of the cosmopolitan in the city and an ethnically and culturally diverse population in the province.

This brief historical introduction has done little more than to set out the main factors of the city's history, which have so profoundly affected both its development and its present socio-economic functions and characteristics, and morphology. The next step is to show how the five main factors listed have in detail shaped the present city - an analysis of early developments, some of which are now finished and unrecognisable, others still growing in importance as dynamic factors in the present life of the city.

Notes to Text and references

1. Quoted in Admiralty 'Handbook of Persia', Admiralty Intelligence Division, p.236. 1945

2. Stratil-Sauer G. 'Mesched'. Leipzig 1937 p.28.

3. Hookham Hilda. 'Tamburlaine the Conqueror' London, 1962, p.18

4. Sykes Sir P. 'History of Persia' Vol.I.p.280 London, 1915

5. Encyclopaedia of Islam, entry 'Tus', V., Minorsky

6. Le Strange G. 'Lands of the Eastern Caliphate' London.p.384

7. idem

8. idem

9. Sykes Sir P. op.cit.Vol.2.p.70

10. Yakut, quoted in Le Strange, G. op.cit.p.391

11. Admiralty Handbook op.cit.p.255

12. Al-Mukaddasi quoted in V.Minorsky, entry 'Mashhad', Encyclopaedia of Islam

13. ibid, loc.cit.

14. ibn. Al Athir, ibid.

15. Sykes, Sir P. op.cit. Vol.2.p.109

16. ibid Vol.2.pp.154-175

17. ibid p.283

18. Lockhart, L. 'Nadir Shah' Chap.III London, 1938
    Pain - Lower: Bala - upper: Khiaban - avenue.

19. Caravanserai - a large building of one or two stories, usually well fortified, and on a courtyard plan, where caravans of merchants and goods could be rested and stored, or exchanged.

20. Lockhart. op.cit. p.197

21. Chardin, J. 'Voyages du Chevalier Chardin, en Perse, et autres lieux de l'orient' ed.by L.Longles, Paris 1811, Vol.VIII.p.287.

22. Sykes, Sir P. op.cit.p.385

4. DEVELOPMENT IN THE RECENT PAST

Introduction

1. Morphology
   - A. Spontaneous growth
   - B. Planned development
   - C. Gardens
2. Nineteenth Century Functional Development
3. Ethnic Diversity
4. Organisation of Society and the Economy
5. Demographic Development
6. Religion
7. Conclusion

INTRODUCTION

Documentary evidence on the history of the growth of Mashhad city is scarce, yet its consideration is clearly essential. Moreover, as one might expect, it becomes more scarce the earlier one proceeds, so that an attempt to summarise the antecedents of urban development is restricted to two types of enquiry :-

(i) The analysis of stereoscopically paired aerial photographs qualified by rigorous inspection in the field to give an idea of the past morphology.

(ii) The documentary evidence provided by the visits of European travellers, largely through the 19th century. It is however not possible to treat these sources chronologically (except perhaps in the matter of population size) since descriptions are intuitive observations by different personalities whose attention was rarely called to similar things - we have different comments, on different aspects, at different dates.

Consequently, it is proposed to generalise these sources into an analysis which can be regarded as the state of Mashhad in the mid-19th century, from which some possible comparisons of the situation of the city then and now, may be made. This will then form a basis on which to assess the changes which have taken place during the last 100-150 years, which is for the purpose of this work clearly the most interesting and relevant period of history, since within it are to be detected the first ripples of

the present flood of technological change, cultural development, and westernisation.

1. MORPHOLOGY. A. SPONTANEOUS GROWTH

Travellers were impressed by the contrast between the golden domes and minarets of the Harram and the rest of the 'squalid' mud-built single storied houses all surrounded by eight foot walls, and narrow Kutches[1] (Plate 2). References to the filthy state of the town are also common - especially to the only water supply of the town, flowing down the main street of Pain and Balakhiaban, and carrying away waste with it. O'Donovan 1882[2] noted particularly :

> 'The activity displayed in the streets of the bazar is in striking contrast to the stillness which marks the other portions of the city'.

However, to gain more than simple descriptive knowledge of the city is difficult, since early growth of the town is much a matter of speculation, particularly as to the supposed location of the village of Nawkan, in a garden of which the eighth Imam was buried. No evidence has been found to confirm the map in the guide to Mashhad[3], showing various stages in the growth of this town. The present quarter of Nogun, however, is generally supposed to be contiguous with the former village 'Nawkan'. Since almost all buildings until the 19th century were merely mud, or mud-brick, and invasion and devastation so common, speculation as to the former extent of the city (pre 19th century) is hazardous. (Plate 1)

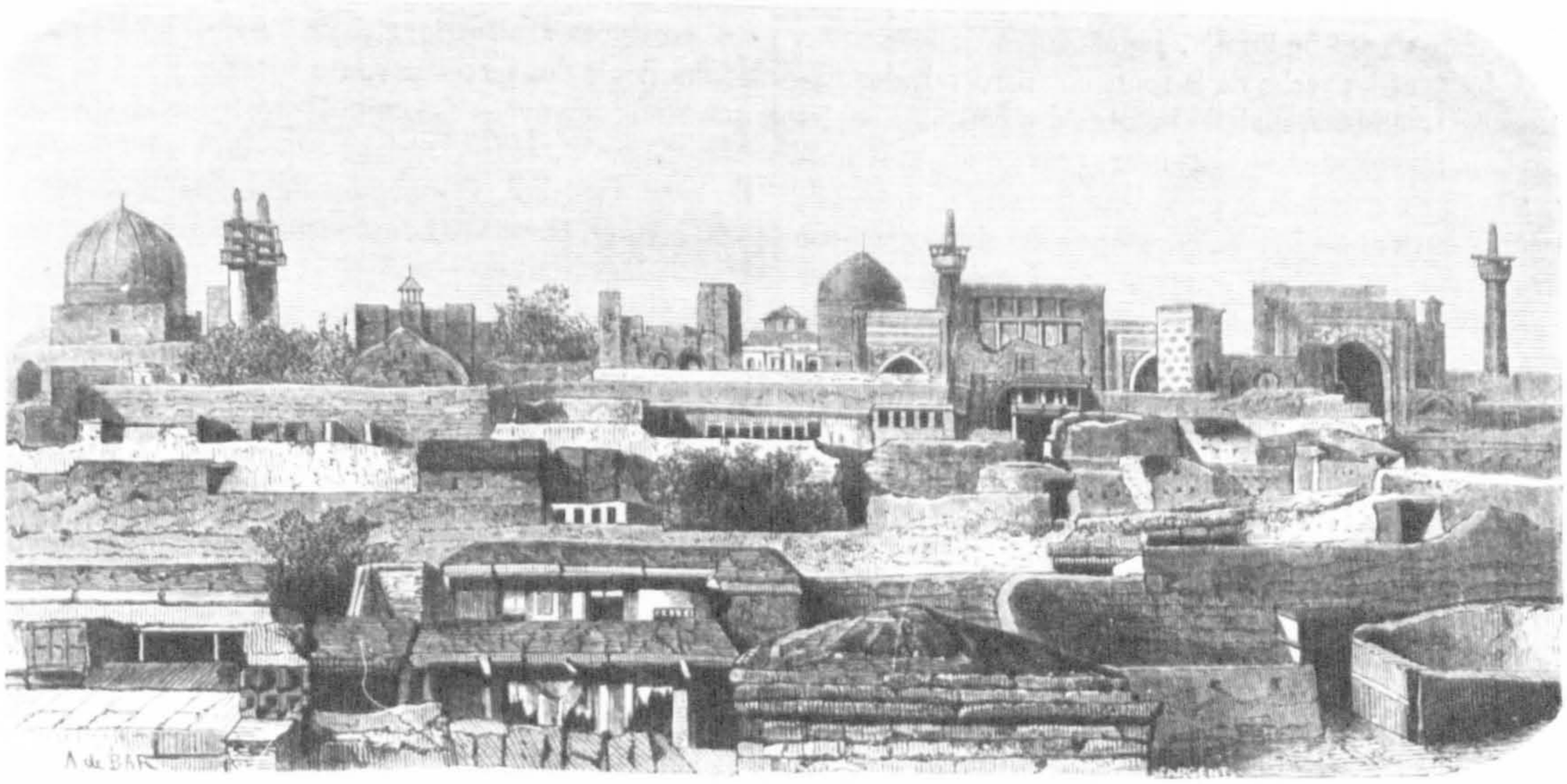
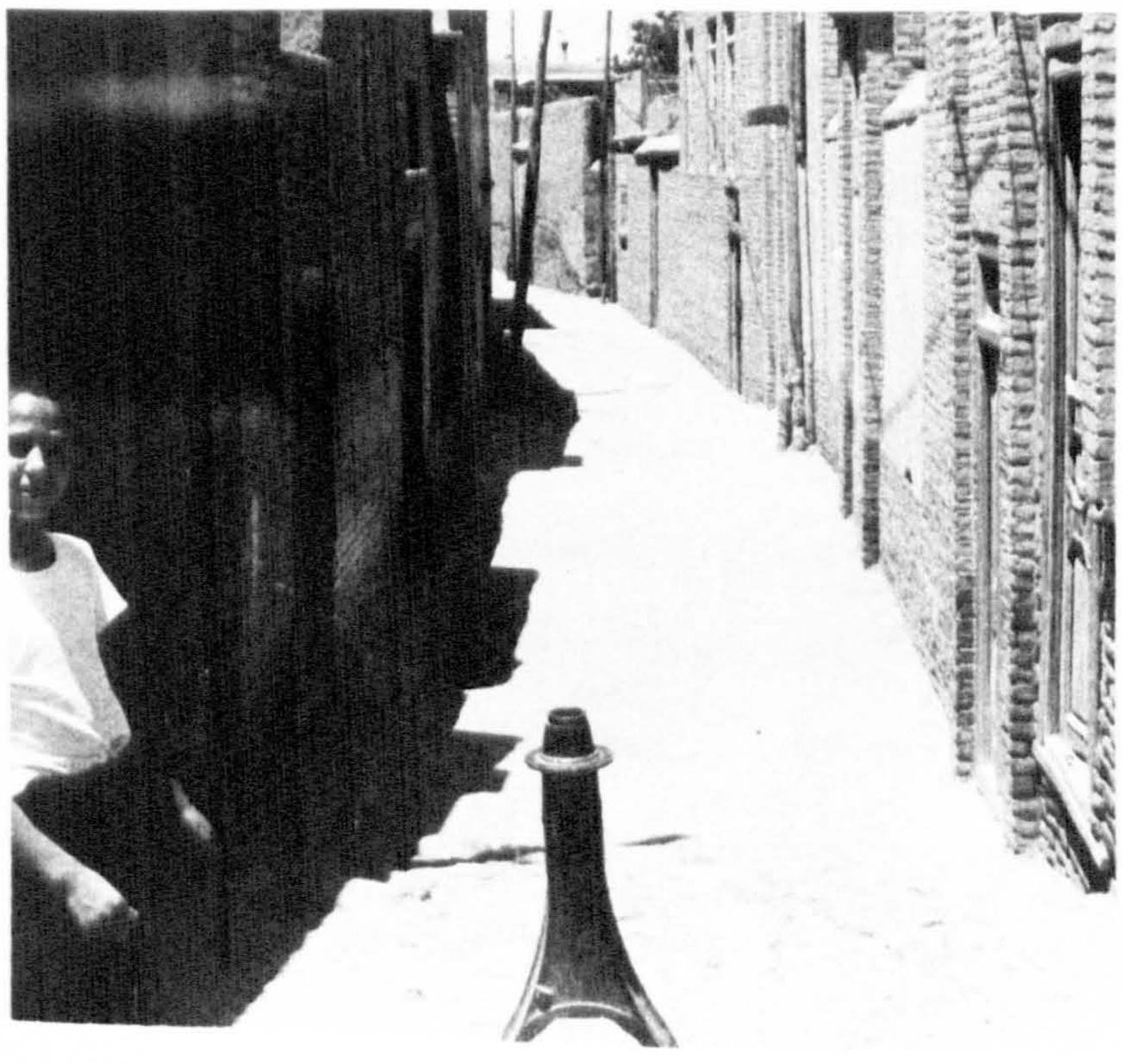


Plate 1. Mashhad in 1858,after Khanuikoff op.cit.

Plate 2.

A kutche in the

old town.

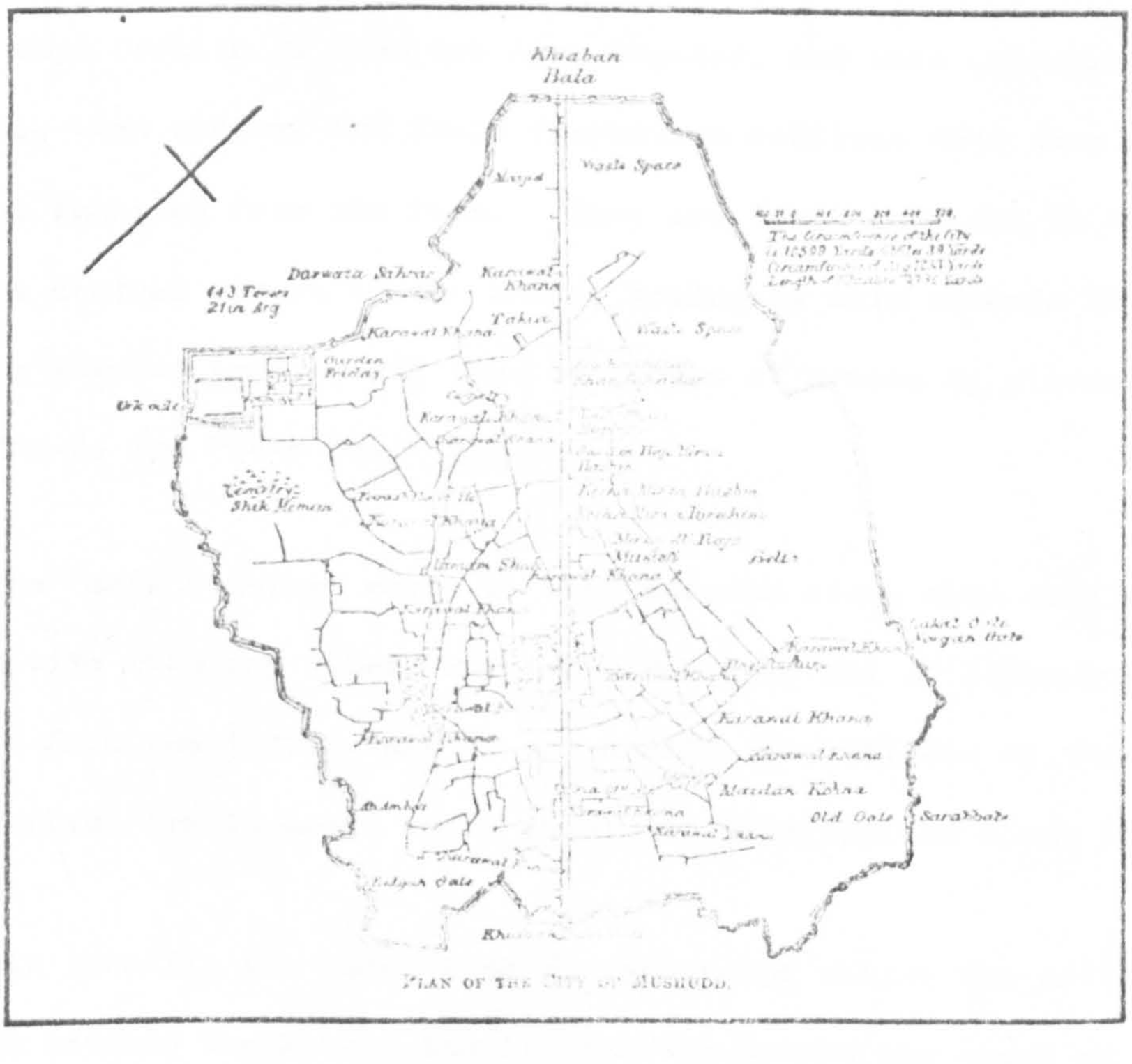


The only old map of the city in existence is that of Col.Bolmage, reproduced in McGregor[4] 1874, and here (Fig.5) indicating the general layout of the city, its walls, gates, fortress or Arg, and graveyards, and of course the Harram, all of which is confirmed by Eastwick's systematic description, sometime later.[5]

Mashhad's unique position derives from the fact that it has grown up around a well-defined single point, the grave of the 8th Imam and the city's very existence and continued growth have until recently been fully dependent on it. But the Harram, which was in the 19th century surrounded by its own wall, has been at once a centre of attraction and a great obstructive barrier to all communications, and indeed any function other than religious observances. Transport of goods through it was impossible due to the religious injunction against the violation of sanctity by the entry of animals into a holy area. The whole pattern of spontaneous development through which the city has lived reflects this one main fact.

The kutches, or alley-systems of old Middle-eastern cities in general, are perhaps the nearest observable phenomena that urban studies have to a truly spontaneous growth process, leaving unmistakable evidence behind it. The alleys represent negative areas between positive building lots, and their course and shape and even height are determined not by any organised, collective decisions of society (except in cases of planning, of course), but literally by a multitude of individual decisions through time. (Plate 2)

MASHHAD, 1874 - 5. Fig. 5.



PLAN OF THE CITY OF MUSHUD.

Reproduced from McGregor, op. cit. p.[illegible]
(North sign inserted).

Indeed the relative lack of planned development, or of collective decision making in Muslim cities, has already been noted above, and by many other authors.[6]

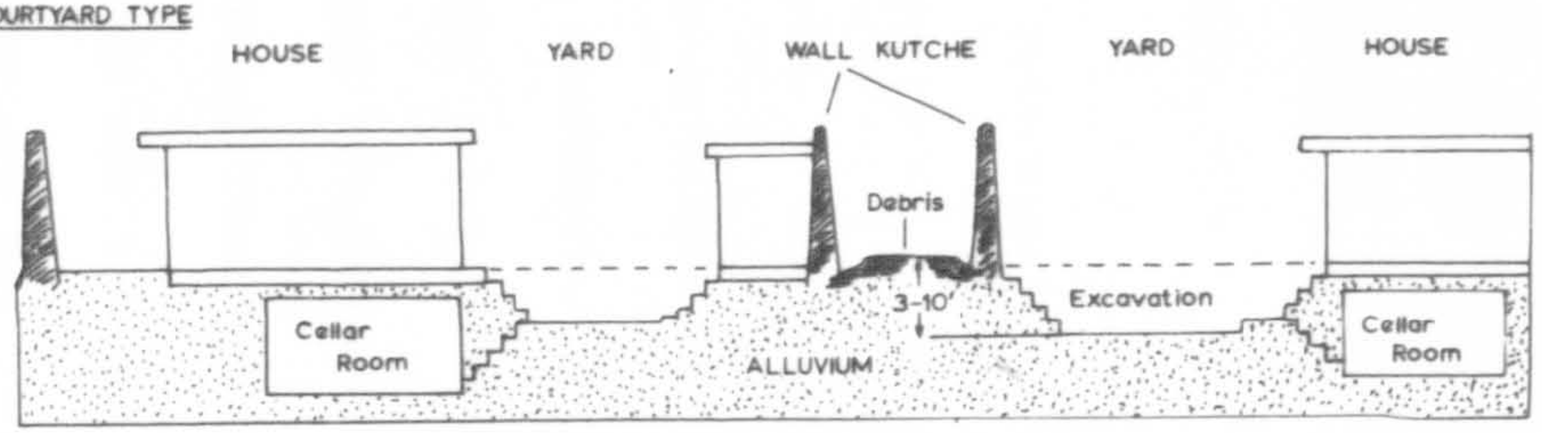
Analysis of the plan of these kutches through aerial photographs reveals that certain of them are less angular, and more continuous in their plan than others, and field inspection confirms that they have a different function from the rest. They are 'main streets' of the old town, the central rivers of the basin, acting as main streams to the many tributary kutches leading off them to groups of houses or a single house (Fig.7, and Plate 3).

These 'main streets' carry or have carried along them more persons per unit time than any others kutches since they act as feeders to or receivers from the latter, and so are easily identifiable by the shops and commercial developments which exist, or have existed along them.

Their identity was checked on the ground by noting the difference in height between the kutche itself, and the houses and shops on each side of it, which may be from 3' to 10' due to centuries of accummulation of debris in the kutche, and due also to equally long periods of demolition and re-building. Since clay structures have a short life-span, but can be replaced easily and usually continuously by using the soil actually on their site, there has been constant excavation within the house-areas, which are normally on the courtyard system, surrounded for security reasons by a high wall, to build the walls. The discrepancy in height thus grows

HOUSE-TYPES, IN SECTION.

Ⓐ. OLD TOWN – COURTYARD TYPE



Ⓑ. NEW TOWN – 'PAHLEVI' TYPE

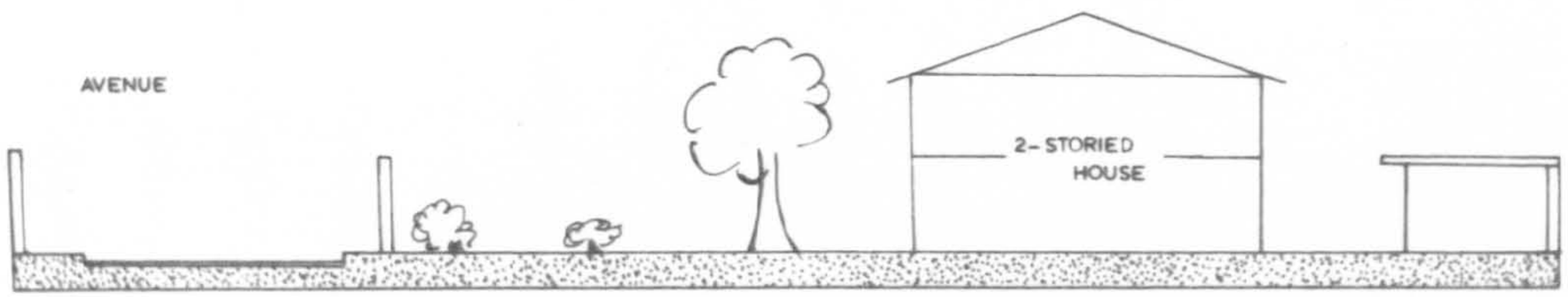


Fig. 6.

through time, dependent (in a direct ratio) on the rate of economic and social activity in the kutches. The more active kutches, all things being equal, have more debris dumped in them, and are bordered by structures which might be expected to change function more rapidly, necessitating a higher rate of demolition and rebuilding (the change for example from a residential to a commercial function). Figure 6A illustrates this.

Using this method of determination (crude and subjective though it is) a map (Fig.7) was drawn up as a tentative reconstruction of the main streets of the old town. The pattern emerging fully reflects the two-fold nature of the Harram discussed above, consisting of radials to and from the centre, and part circulars, in the form of tetrahedrons increasing in distance from the Harram, through time, due perhaps to successive circumvallations (the height between courtyards and kutches, generally oorrelates with this). These Kutches represent, then, early 'desire lines' for movement of goods and traffic from one point to another of the city without passing through the Harram - they are not circular in plan but tangential to the Harram, curving in towards it slightly. The necessity for this kind of circulation was recognised in the 1920's by Reza Shah's planners, who constructed the great roundabout around the Harram. (Plate 7)

By the nature of their function, it is these main streets which have become the bazars of the city - retailing and other non-residential functions being located where the potential number of customers is highest.

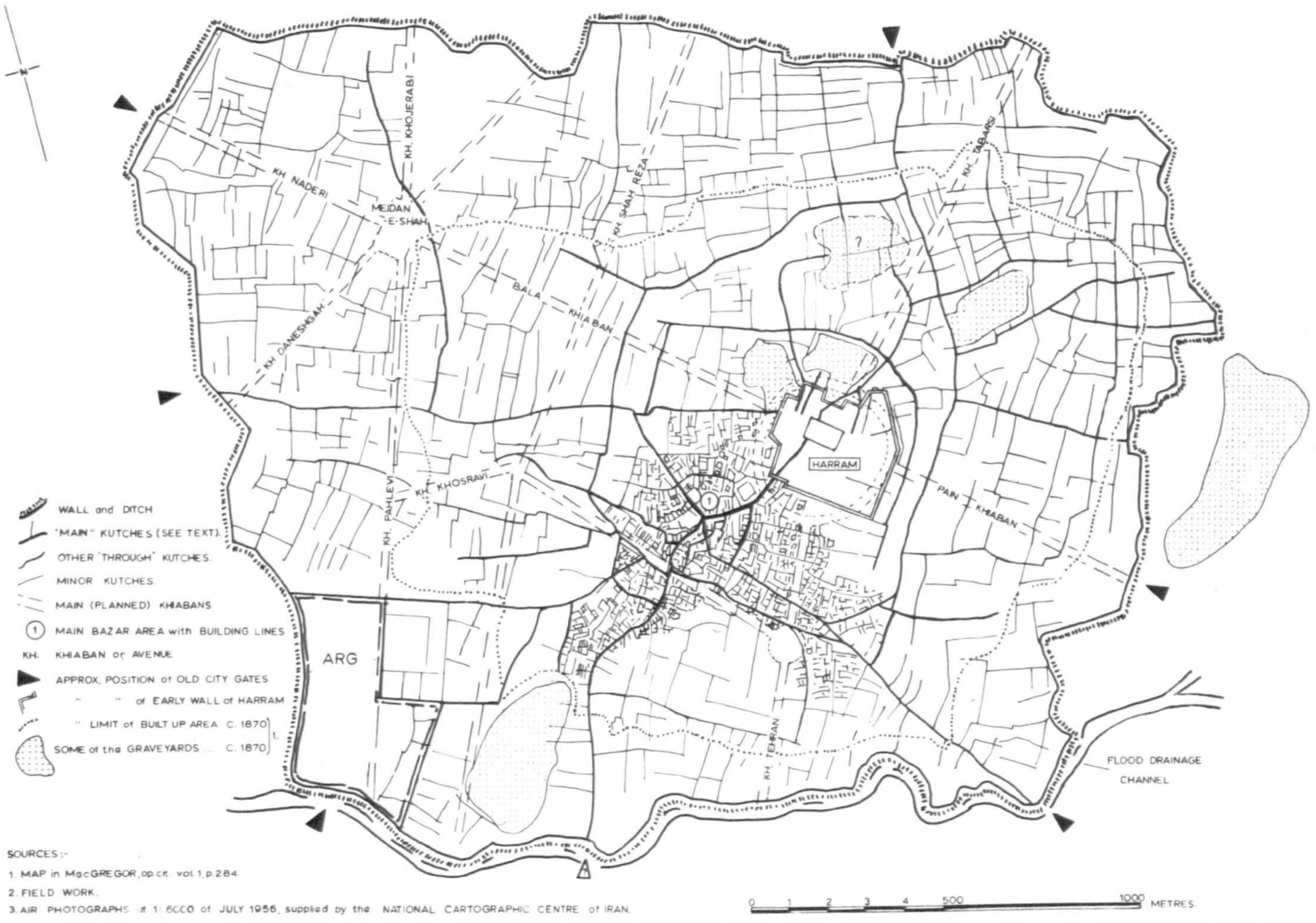
So the 'bazar' is to be regarded not as a special and extraordinary phenomenon requiring a particular set of explanations, but merely as a more intensive use of existing land. (Plate 4) The central area of the map (Fig.7) drawn directly from available aerial photographs[7] emphasises the situation outlined above. It represents the dominant building lines, shared boundary walls of houses, etc., and indicates they way in which successive structures have been added through time to the margin of the contemporary built up area, using the walls in existence as a starting point, and served by the paths from the main kutches, which later became the residential kutches, as outlined above.

MORPHOLOGY B. NON-SPONTANEOUS GROWTH

Mashhad, in common with other Iranian cities, has had in its history some planned building, restricted however to religious edifices, royal palaces, and military installations such as the Arg (fortress) and the walls. It should be noted however that this is not planned development, but merely planned individual buildings, erected without necessarily considering the rest of the urban environment.

The most frequent types of buildings are of course additions to the Shrine, or the Harram generally, by monarchs and others. More significant, however from the point of view of urban development, are, firstly, the defences which still control the morphology of the city to an extent, and secondly, Shah Abbas' act of real planning, in laying out the great wide avenue of Pain Bala Khiaban - originally intended as a proper approach

MASHHAD - ORIENTATION of STREETS, and some FEATURES of the OLD TOWN.



SOURCES:-

1. MAP in MacGREGOR, op.cit. vol.1, p.284.
2. FIELD WORK.
3. AIR PHOTOGRAPHS at 1:6000 of JULY 1956, supplied by the NATIONAL CARTOGRAPHIC CENTRE of IRAN.

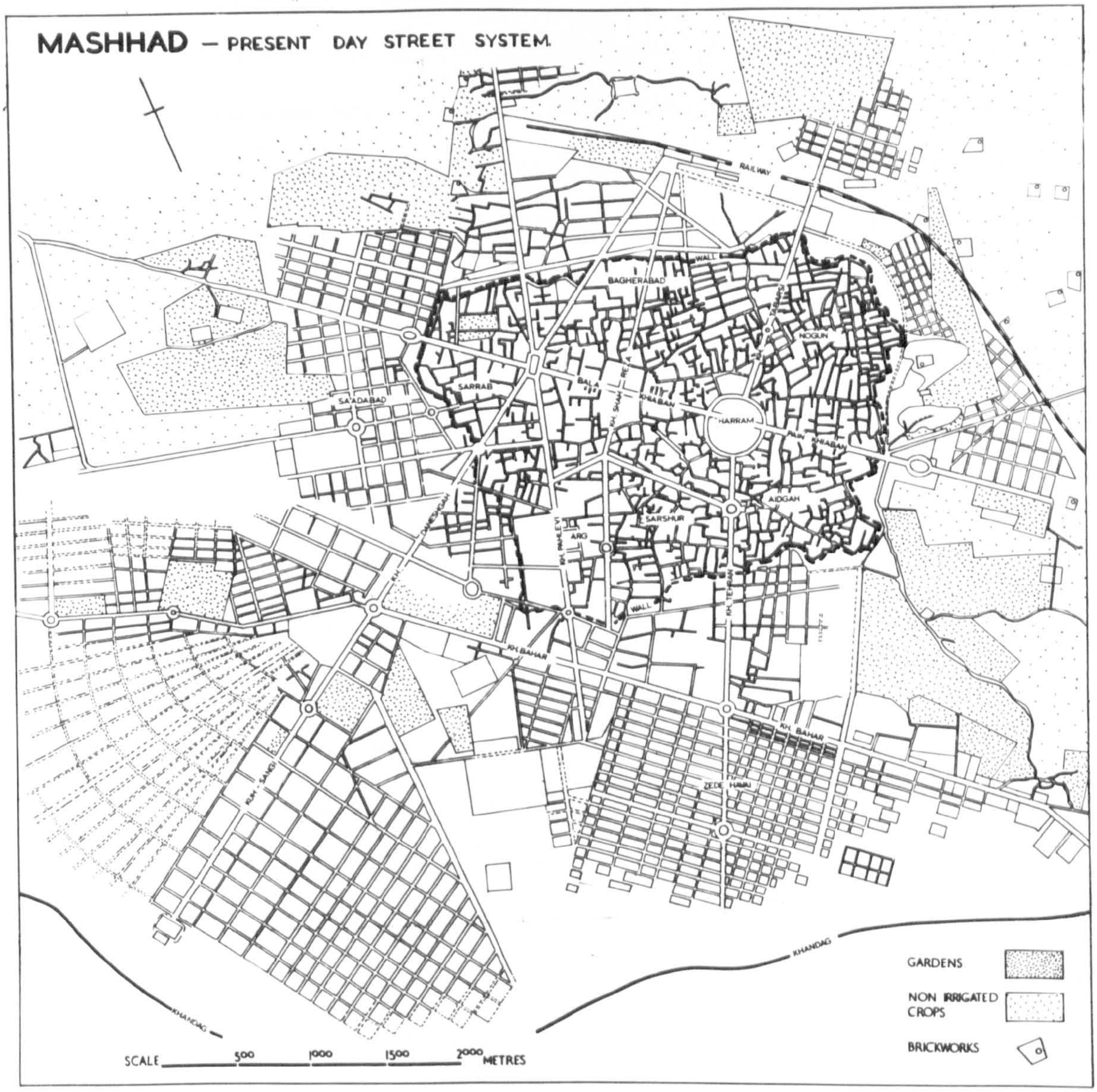
Fig. 7.

to this pilgrim centre, but having profound effects on both the location-economics and the morphology of the city (Plate 5).

The wall and ditch, built at various times between 1037 and 1121 A.D. and enclosing an area much greater than the built up area, have been significant in the city's growth. Early growth of the city (pre-18th century) may well have been towards the north and east, since the city's buildings reached this wall at an early date, but development in this direction has long ceased, and until 1958 the wall, still standing in the N.E., and a large cemetery (now disused) have marked the boundary of the built up area in the N.E. and later growth has largely been westwards. These statements must however be qualified by the fact that the wall was laid out with the centre of the city (the Harram) much displaced to the east - no doubt in order to include land not yet built on, for agriculture. In the west and southwest, where the edge of the built up area may not have reached the wall until the 19th century, modern building techniques meant that the wall was much less of an obstacle, and has controlled only to a slight extent the growth of the city, as the growth series of maps (Fig.9) indicates.

The origins of the Arg (or fortress) are somewhat obscure, and research reveals no date of building, though its later position may well have been established at the time of Shah Abbas (16th century), somewhat isolated from the town in the S.W. corner of the walled area - this being a common feature in many Iranian towns (Isfahan, in the 14th century, for example) - and as Pope[9] points out, especially those in which a mosque

Fig. 8.


MASHHAD — PRESENT DAY STREET SYSTEM.
RAILWAY
WALL
BAGHERABAD
NOGUN
SARRAB
SA'ADABAD
KH. SHAHID BEHESHTI
KH. SHAHABAD
HARRAM
AIDGAH
SARSHUR
ARG
KH. PAHLEVI
KH. TEHRAN
KH. DANESHGAH
KH. BAHAR
KH. SANGI
ZEDE HAWAI
KHANDAG
GARDENS
NON IRRIGATED CROPS
BRICKWORKS
SCALE 500 1000 1500 2000 METRES

or square was the original growth point.

The Arg probably served as a vast fortified gate-house in which royal treasure and provisions were stored, and which acted as a barracks and armoury. It had a square, Meidan-i-Tapp, in front of it, used for military exercises. The Arg was dismantled in Reza Shah's modernisation drive, but the area has retained its original functions, for the National Bank, Finance Dept., Army H.Q., Post Office and former customs house are all located on its site.

Apart from the Arg gate, the walls had in them 5 other gates,[10] to which the 'main streets' led (Fig.7); indeed one of the main bazars which has declined somewhat, had developed along the kutche connecting Mosque to Arg, and was of obvious importance until Abbas' new main avenue Balakhiaban leading from the palace-site to the mosque was constructed in 1701, taking on all the functions of a bazar, without the physical appearance of one. The palace area, which was built up chiefly under Nadir-Shah in the 18th century, situated at the end of Balakhiaban (now its mid-point), was not finished until 1876[11], but long after its removal and demolition its site still holds central functions-in this case the administration of the shrine, the telephone exchange and others.

However, perhaps the greatest single feature in the control of Mashhad's otherwise spontaneous growth has been the presence of huge graveyards, the result of the Shia' belief in the importance of burial close to the grave of a holy personage. The high ground rents

Plate 3.

A 'main' kutche with commercial premises in it.

Plate 4.

Bazar Sangtar--shah, near the Harram.

demanded by the Shrine were obtained since demand for space far exceeded the area available, and a system of charges per grave grew up, decreasing in price with distance from the shrine.

Morphologically these graveyards (sanctified and therefore not available for building) had two main effects. Firstly, they channelled city growth into the spaces between them - for at first graves were a higher source of ground rent to the shrine than were buildings - and the Harram area was thus vastly enlarged and created even greater obstacles to communication. Secondly, after a period of several years enforced non-use out of pious respect, they provided valuable building space in central areas, the street system often being moulded by the original shape of the graveyard. Their distribution within the city at any one time is difficult to determine, though McGregor[12] indicated some Makbara (Fig.5), and a list in the Encyclopaedia of Islam provides names of others which have been inserted on the map (Fig.7).

References to them are common :-

'... within the enciente of the town, are numerous cemeteries of immense extent far exceeding the requirements of the population'[13]

Bassett[14] writing in 1871-5 however, maintained that although graveyards were plentiful, there seemed to be a few in the North of the town, which could be due either to a mistaken North sign (as in McGregor's map) or perhaps indicates that already by that date, pressure for urban land had led to the graveyards being built upon.

C. GARDENS

It was Bassett (1871) who noted that :-

'Mashhad is not so large as the extent to its walls might lead one to believe. Much of the land enclosed is in gardens, and some near the walls is vacant. Considerable farming is done on the outside of the walls'. And in 1830, Connelly wrote:-[15]

'.... though the city walls of Mashhad embrace a great space, there are within them many gardens, large cemeteries, and much waste ground'. In common with most Persian cities the walls were extensive enough to allow food (for the wealthier members of society, and the army) to be grown within them in the event of seige, an event not uncommon in Mashhad's history. It would seem then that physical expansion of the built up area had not been great in the years 1830 - 71. However, by 1877, Marsh[16] was reporting that 'within the last few years orders have been given not to bury any more (persons) within the walls'.

This might well indicate that demand for land for building purposes was causing its price to rise near to the value of the same land for graveyards, which at further distances from the shrine would realise much less in any case. The shrine governors were possibly influenced in this by the fact that decaying corpses, often not properly buried and sometimes exhumed to make room for others, were not a healthy proposition for this fast growing community, which still had water problems. Indeed Goldsmith[17]

reported a serious outbreak of cholera in 1871, which he claims caused 24,000 deaths, resulting in even greater demands for burial space, and necessitating some preventive steps.

The graveyard still in existence outside the N.E.wall of the Nogun quarter may date from this time. It reinforces the wall as a morphological boundary prohibiting building over a large area and preventing expansion East, partially because of religious laws prohibiting building on holy ground, and partially because of the danger of pollution of water sources. It was not until the 1960's that new buildings were erected in the East - and even these are on the other side of the now — disused graveyards.

The dominant direction of growth to the city, to the W., is therefore a combination of negative factors such as the one above, and also the more positive factor of a fresh-water supply via the qanat system. For hydrological considerations, qanats have been more productive on the western side of the city, consequently anyone moving out of the city centre, usually wealthier families in the later centuries of the city's history would attempt to build a house further west than all the others in order to have its own supply unpolluted by the wastes of any houses 'upstream' of it. This consideration was important in the city's history, until the 20th century, when techniques of well-drilling to depths which would allow a reliable supply at reasonable cost, were made available, and when the system of piped water was first introduced under Reza Shah.

MASHHAD – SUGGESTED GROWTH

(a generalisation based on sources consulted)

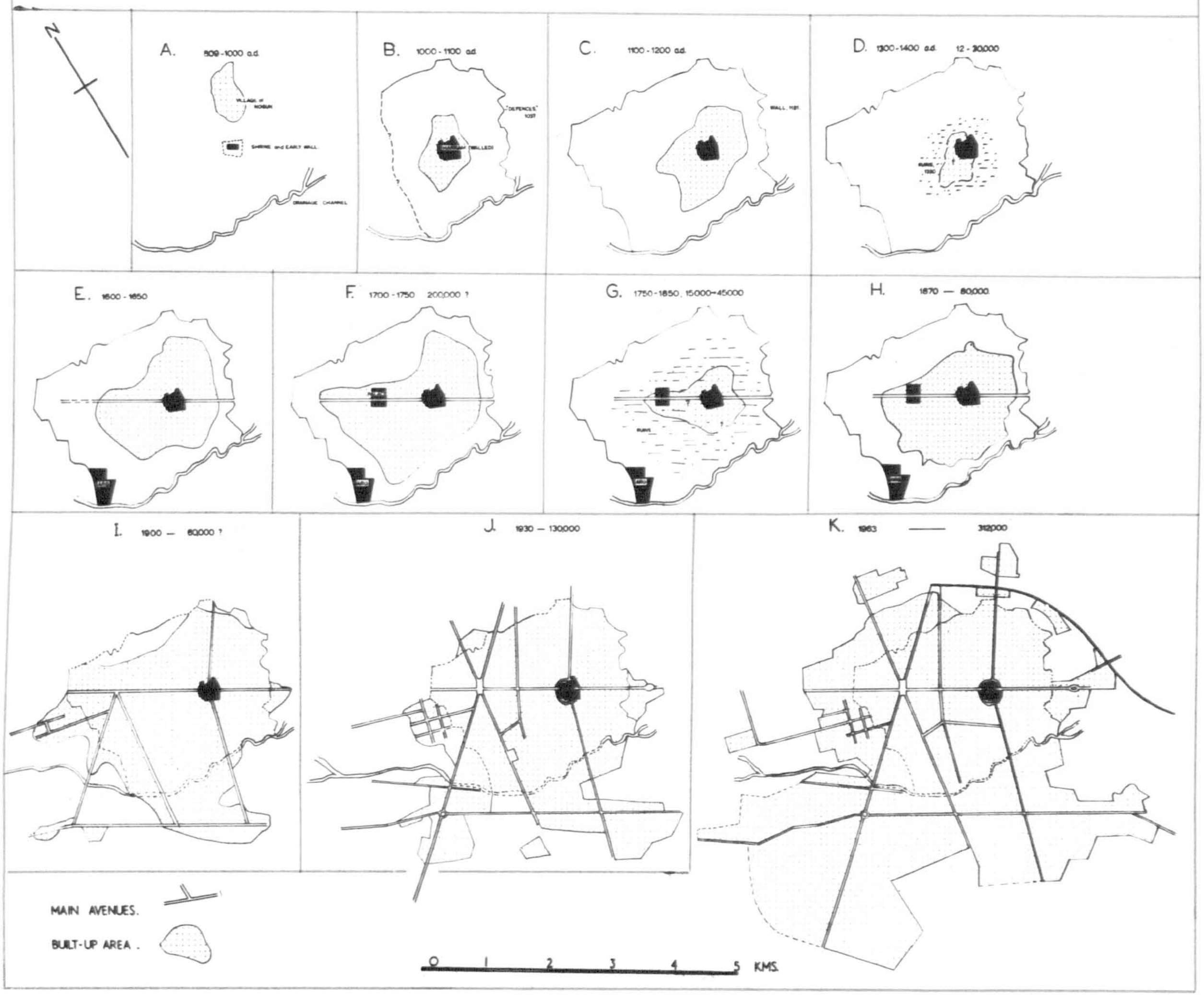


Fig. 9.

D. OLD AND NEW

The great contrast in morphology between 'old town' and 'new town' in Mashhad is a late development - as it appears to be in many Middle Eastern cities - and is the superficial manifestation of many profound changes not only in technology but in social and economic factors. (Plates 7 and 8 and Fig.8) The standard type of town house, constructed out of mud or mud-brick, was until the late 19th century , on the courtyard system. This is a method of ensuring security for its inhabitants (particularly the females members of the family) behind the eight or ten foot wall, and is partly an expression of the extended family system, in which large groups of relatives occupy the same building. This type of house is a building with one floor, plus a lower one almost wholly underground as a protection from summer heat, with a flat roof (or domed in the case of poorer families who could not afford such an expensive commodity as wood). It is normally standing at one end of its courtyard or garden, with a small 'hose' or pond in the centre used for a multitude of functions. (Fig.6A)

However in the late 19th century, and especially in the 20th century under Reza Shah, several changes took place. Firstly, public security was now much more assured and secondly, the technique of brick-making in large factories reached Iran (indeed the groups of factory chimneys are the common first sight of any Iranian city today). These factors coupled with other technological innovations such as the use of galvanised steel sheet for roofing, and Reza Shah's rectilinear planned street systems, have led

to the existence of the 'new town'. The new (2 storied) 'Pahlevi' homes tend to be free-standing in the garden with a wall surrounding - often still eight feet high despite increased security (Fig.6B).

These new houses are however the privilege of a few. Most buildings in 20th century Mashhad are still of mud-brick (or mixed mud-brick and fired brick), as the 1956 census figures show:

Table 4

HOUSING UNITS CONSTRUCTION - MASHHAD 1956 (Census of Iran, 1956)

	No.	%
Total	54,219	100.0
Brick	11,183	20.6
Sundried Brick	4,629	8.5
Brick and Sundried Brick	33,620	62.0
Mud	2,739	5.1
Stone	5	-
Wood	36	-
not reported	2,007	3.7

But since these morphological differences are merely the external expression of many complex variables and determinants, their discussion need not detain us. For the purposes of the thesis 'land use' will be defined in a functional sense, and later analysed as such- the analysis of form thus becomes less relevant.

In summary it can be said that in the last two centuries, certain morphological developments have taken place, some spontaneous, some

planned. The latter however must not be regarded as an 'exceptional case' even in the 1601 creation of Bala-Pain-Khiaban since many cities in Central Asia, including Herat, Merv, Samark-and, Bokhara, and Ashkabad have had simple plans at early dates, and often far-sighted tree-planting schemes. Early and late, some planning has been a 'normal' part of development in all these cities.

2. THE 19th CENTURY - FUNCTIONAL DEVELOPMENT

O'Donovan (1882) [18] observes that -

'Coppersmiths abound in one quarter of the bazar and deafen passengers with their hammers as they make their pots and pans'

It would seem then that specialisation by product was established in Mashhad, a phenomenon normally associated with cities in Central Asia, and the Middle East. He adds too, that the south side of Balakhiaban was devoted to the marketing of fruit and vegetables at this time. This comment is of some significance, since today fruit and vegetable marketing, although on the same avenue, has migrated west along it, as the built up area progressed westwards, and is now two kilometres from its 1882 position. A hint at growth by succession, due to economic factors such as increasing rents, or congestion in central areas (particularly this latter, with the use of motor transport in the early 20th century) is evident here, and may well have applied to other aspects of economic location.

Fifty years earlier, Ferrier (1830) [19] had noted that

'Retail shops line the avenue (Pain, or Balakhiaban). The merchants meet in very handsome caravanserai of recent construction,

Plate 5.Pain Khiaban,a general view,facing the Harram.

Plate 6. Inside Bazar Bozorg.

> and in bazars, which altho' roofed in are narrow and of small extent, quite unworthy of such a city'.

This statement is the key to the problem in definition, as it would seem that Ferrier made the error of seeing the 'Bazar' only the terms of physical form, ignoring its economic functions, which led him to make an unwarranted distinction between the shops in what he terms the 'Bazar' and those in the 'main street'. Whilst in functional terms there were probably differences between shops in either location (as later analysis will demonstrate) in effect, 'bazar' is merely an area of more intensive commercial activity differing only superficially in kind from activity elsewhere in the city, until very recently. (Plate 6) The main Khiaban, constructed as early as 1601, with site advantages over the narrow kutches around it, attracted commercial activity to it - consequently the traditional physical form of 'bazar' is not well developed in Mashhad.

Other comments from the 19th century travellers allow an equally tentative assessment of the city's relationship to the area around it at this time. Clearly most of its food must have been grown outside the walls, - how then was the distribution of this agricultural production arranged?

In 1882, O'Donovan[20], approaching the city from Goochan (N.W. of Mashhad), a distance of 90 miles, which at that time took seven days, noted:-

> 'Within a day's journey of Mashhad, the

cornfields began to be replaced by large melon and cucumber patches'.

Assuming he travelled an equal distance each day, this would put the transition 12-13 miles from Mashhad, along that road (west). The influence of the city as a market was clearly important, and agriculture was 'zoned' to some extent already, with distance from the city - a fact which illustrates remarkably well the theory of von Thünen[21]. The melons and cucumbers, perishable and needing higher inputs of both labour and 'capital' in the form of 'night-soil' fertiliser transported out from the town, and bulky and difficult to transport without damage, were (and still are) grown in a belt close to the city, which has not expanded despite a modern road, motor transport, and the use of chemical fertilisers which to some extent replace 'night-soil'.

Khanykoff (1858)[22] had also noted these relationships, in two respects. Firstly, he emphasised the existence of a belt of villages in the foothills south of the town producing fruit, and acting as a summer resort (as they still do). Secondly, in other directions, up to about 7 Kms from the town, he noted villages :-

'riche en vignobles et en champs ensembles de melons'

It would be stretching the evidence to comment on the different distances given here by the two authors; but it would seem that agricultural zoning was established, at least in the simple form:-
(1) Vines - (2) Melons and vegetables (3) wheat and barley, and that the influence of modern technology seems not to have destroyed this basic arrangement, but rather to have emphasised it, producing more sophisticated

sub-divisions of these basic zones.

3. ETHNIC DIVERSITY

One of Mashhad's chief characteristics in its recent history has been the diversity of its population, a product of its character as a 'marchland' of repeated invasion and migration of tribes from N. and E., and 'liberation' from thewest, as well as the planned transplantation of tribes to the area by both Nadir Shah and Shah Abbas to guard the frontier.[23] Rough breakdowns are fairly common, though not necessarily reliable, and perhaps Curzon's is the best[24]. (See Table 5) The figures apply to the province as a whole, but for the city itself there may well have been (as there is now) even greater diversity, increasing with the growth in importance of the pilgrim traffic, which was encouraged from time to time by royal support. Thus there is not only a complete representation of 'Iranian' peoples in the city but also many Pakistanis, Arabs, Turks, Chinese, Mongolians, Afghans and Russians united in their common religion Shiism.

Table 5. Ethnic Structure of Population, Khorasan, 1892

1. Iranian	Tajik	400,000	
	Kurd	250,000	
	Baluch	10,000	
2. Mongol	Timuri	250,000	
	Hazari	50,000	
3. Tartar	Afshar	100,000	
	Kadjar		
4. Arab		100,000	
TOTAL		1,160,000	

Source, Curzon, op.cit.

However, in an era when mechanical transport was only just appearing and in an area in which roads were still either non-existent or very bad, transport was an insurmountable problem for the great majority of people. Thus as late as 1870, Tehran was still one month's journey away[25] by caravan, and in 1936 still 3-4 days, by motor transport[26]. Consequently, '<u>ferengi</u>'(foreigner) was a term that could well be used for other Iranians, as well as other nationalities, since language difficulties were often almost as great. This was especially the case outside the city, where levels of literacy and general experience were (and are) so much lower. Under the influence of new and more common methods of transport this situation is however breaking down, for Tehran is now only 2 hours air-time away, 18 hours by rail (available since 1956) and 18-36 hours by bus. This of course increases the number of foreigners coming to the city, but it increases proportionately the level of acceptance and awareness of them, so that whilst cosmopolitanism is still strong, the proportion of persons regarded as 'ferengi' is much less.

4. <u>SOCIAL AND ECONOMIC ORGANISATION</u>

Society in Islamic cities of the past was organised along tribal lines, characterised by vertical structure. The extended family was the basic unit, and groups of such families often formed some larger unit such as a sub-tribe or clan, living in close proximity, rich and poor, priest, intellectual and worker, in one quarter of the city. Horizontal class divisions were unimportant and indistinct. The'<u>hara</u>'or'<u>mohallah</u>', or quarter of the city, occupied by members of one clan, and often separated

from other hara by walls, was particularly common in Arab cities[27], and although internal walls probably did not exist in Mashhad, this type of unit must have been important, since the diverse ethnic origins of the city's population tended to maintain mutual isolation.

Industry and commerce was also characterised by vertical structure whose origins may well have been in the tribal society of nomadic Persia and Central Asia which preceded the advent of urbanism. Hilda Hookham[28] indicates that amongst the hordes of Tamburlaine the Great, the long summer and winter camps were organised spatially along the sub-tribal lines, with each sub-group carrying out its own specialism. This type of camp thus had many of the characteristics of a city of the same period. Streets of blacksmiths, saddlers, coppersmiths emerged at the centre of that section of the encampment in which the sub-group concerned was dwelling. This bazar or suq (market) type of organisation still characterises the cities of Iran, and the Middle East, to some extent. Dealers in a particular product such as shoes were to be found located in a specific product bazar, whether they were by function producers, retailers, wholesalers, or any combination of these. Again, horizontal divisions (by function) were indistinct, and there was no particular reason for them to be maintained. Vertical structure in both society and the economy had its expression in two further institutions.

The taifa (chiefly of Arab cities) was a trades corporation with extensive non-trade functions such as religious observance, and peace keeping, and it was the religious function which may have been responsible for the longevity of the taifa. Whilst the corporation maintained standards and acted as an insurance society for its members, preventing undercutting and overcharging, it was also in part responsible for the stereotyping and regression of city industries in many cases. The head of the corporation, the seyh, was normally responsible for maintaining discipline amongst its members, and for providing a liaison between the members and central authority.[29]

The guild system most probably emerged as yet another expression of this vertical organisation, and in Arab cities in particular members of a specific trade-guild were normally of the same kin or clan, and lived together in a particular quarter of the city. This was largely a self-perpetuating system whilst standards of literacy and technology remained low, since skills had to be passed on by experience and word of mouth from father to son, and were thus maintained in the family or kin system. The guild, asnaf in the Arab world, and senf in Iran and Mashhad, was distinguished by restricting membership to those persons dealing in one product, though internal horizontal divisions into masters, journeymen and apprentices did exist. The guild controlled production standards and quality, and sometimes laid down minimum and maximum prices, whilst the right to run a business, the gedik, was granted (at a fee) only to master workmen who could show that their experience and work were of a sufficiently

high standard[30]. Religious functions and ceremonies were also an important part of guild life.

The hara, taifa and senf were thus the three main urban institutions, expressing the vertical organisation of society and the economy, and a result of the close kin ties which bounded economic and social affairs. In Mashhad today remnants of these three institutions are still to be observed in the formation of groups pertaining to quarters or guilds, or the corporation during the religious ceremonies (chiefly processions) of Moharram, the Shia' religious month of mourning for the death of Husain, and the eighth Iman, which is centred on Mashhad.

5. DEMOGRAPHIC DEVELOPMENT

The notorious difficulties of dealing with population statistics in underdeveloped areas are increased by many times when we consider the past trends, evidence for which rests only on the intuitive estimates of various travellers in the 19th century or earlier, many of whom, as Sjoberg[31] points out, are prone to exaggeration. What follows then is mere approximation towards reality.

Early writers did not comment on the population, save for Ibn Batutah,[32] who claims 25-30,000 in 1330 A.D. which was 50 years before the end of Tus, in the lull between the two Mongol invasions. Claviljo's[23], figure of 12-15,000 in 1403, reflects the effect of the period of insecurity, and invasion of Tamburlaine's armies. Estimates of the city's size under Shah Abbas are not available, and though, as Sjoberg[34] points out

in mediaeval urbanism size may have little to do with importance, or vice-versa, it is fairly safe to assume that at such a period of prosperity, Mashhad's population may have been great.

For the city under Nadir Shah, whose capital it was for some time, estimates are more frequent, and more varied. 200-300,000 is given in the Admiralty Hand Book[35], and 60,000 houses (about 300,000 persons) in Yate[36]. Although estimates such as this are common for Isfahan and Shiraz at various peaks in Persian history, this one does seem excessive - even if we assume the city to have been built up to its walls at this time, which is most unlikely. Today, there are only 150,000 living within the walls[37], most of whom are in high density housing. However, as seen, there is ample evidence to suggest that the city was never built up to its walls until the late 19th, or early 20th century. These estimates must therefore be regarded as exaggerations, or as including the agriculture community outside the walls.

Apart from the estimates at the beginning and end, there are none for the bulk of the 18th century, so that we have an undocumented decline during 60-70 years, from the supposed 200-300,000 down to 20-30,000.

In this period of the Zands and Kajars, almost all development was in the west and south west of Iran, near Shiraz and Isfahan, the capitals. The lack of data is then possibly causally related to a lack of interest in this remote area which was invaded by Afghans, and exposed generally to the Central Asian hordes. The continuous decline, if real, may be an effect of these trends.

Table 6 Main estimates of population for Mashhad, fourteenth century to date

Source	Date	Population
Ibn Batuta'h	1330	25-30,000
Clavijo	1403	12-15,000
Admiralty Handbook	1720's	250,000
Yate	1736-47	60,000 houses (300,000 ?)
Yate	1796	3,000 houses (15,000 ?)
Admiralty Handbook	1796	20,000
Truhilier	1807	4,000 houses (20,000)
Frazer	1823	7,700 houses (25-30,000)
Connolly	1830	45,000
Burns	1832	45,000
Ferrier	1856	60,000
Khanuikoff	1858	60,000
Eastwick	1864	80,100,000
Napier	1874	45,000
Bassett	1871-5	60,000
Baker	1876	80,000
Curzon	1889	45,000
Yate	1900 (?)	60,000
D'Allemange	1907	80,000
Stratil-Sauer	1933	130,000
Census Office, Iran (sample)	1941	147,000
" " " "	1956	241,989
" " " (estimate)	1958	252,013

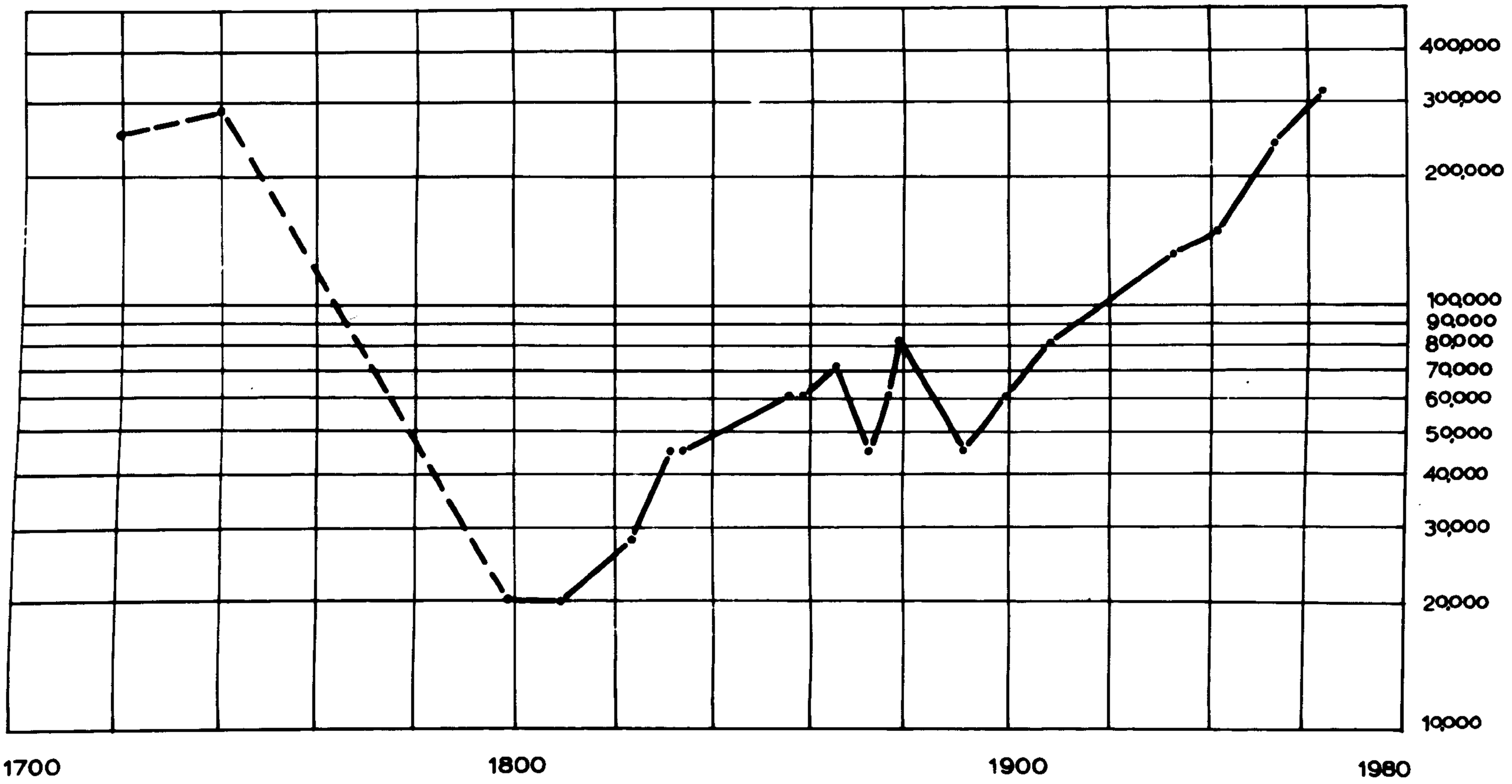
Table 6 (contd...)

Source	Date	Population
Census Office Iran (estimate)	1959	257,225
" " "	1960	263,988
Census Office, Iran (sample)	1963	312,186

References in parentheses are non-contemporaneous, non-original sources.

For full references see notes to text (this chapter) and bibliography.

ESTIMATED GROWTH of POPULATION , MASHHAD CITY , 1700 - 1963.



For full references see notes to text.

Fig. 10.

During the 19th century, estimates are more frequent, and appear in most instances to be more realistic, though this may well be due to each author copying his predecessor. Fig.10 and Table 6 indicate the main estimates including those less probable. An increase throughout the century has been subject to certain notable fluctuations, some of which correlate with certain 'natural disasters' such as cholera epidemics which were very serious at the given state of technological knowledge. Thus Goldsmith's[38] claim that in the few years before 1874, 24,000 people had died in such an outbreak, may be substantiated by the down trend in the graph 1864-75. An earlier uptrend, prior to 1860, is explained by Ferrier[39] as due to an immigration of people from Merv, Herat, Sarakhs and Kandahar. In general, the 19th century, compared to previous centuries, was a relatively stable and secure one for Mashhad, and the increase in the curve may be a reflection of this. It would however be inconsistent to interpret other fluctuations in the graph in terms of events which are based on the flimsiest of evidence.

However, it would appear that there has been no real population 'explosion' in Mashhad: indeed, the rate of growth, though great from 1900 to today only just matches that of the period 1800-1860, both periods being separated by one of a static, or even a declining population, in the late 19th century. An explanation for this central period of static growth or decline is not easy to find, and indeed it may be more apparent than real in the sense that the later 19th century was the most well documented, being the high period of European travel, and fluctuations

in the population are more thoroughly recorded than in periods before, and immediately after. If it is real, then the only available explanations are the natural checks of epidemic and famine, and the usual one of insecurity and instability, plus foreign intervention, which was by this time gaining place. The resumed growth after 1900 may well be due to the effect of a lower death rate due to the introduction of technologically simple and cheap medical facilities, and improvements in water supply comparing favourably in this trend with other cities of Iran. It may also be due to the increase in the rate of rural immigration towards the end of the 19th century and during the 20th century. The presence of integrated minority communities within the city, such as Sistanis, and Qa'aenis from the south at about this time, lends weight to this possibility.

6. RELIGION

This, the driving force in the city's existence, has, until very recently, grown in strength continually. Indeed, the income derived from the visits of the pilgrims to the city, and the rents of the ostanegots (the shrine administration) from its lands and endowments, have been the main economic support of the city. The ostanegots the 'state within a state', distributing its income in the form of social benefits, clinics and meals for pilgrims, as well as supporting its own army of officials and students, has loomed large in the economic life of the city.

The number of pilgrims was difficult to assess in the past and it is today

yet it is the ratio between the number of visitors and the permanent population that has been a direct indication of Mashhad's prosperity, often high contemporaneously with financial and endowment - support of the shrine. However, estimates of the numbers of pilgrims have been so widely fluctuating, and in many cases equally improbable that this ratio is never clear; and even today, modern research techniques have little success in the determination of pilgrim numbers.

Eastwick (1864)[40] seems to have the best source and is perhaps the most reliable. By October 1st in 1864, 50,000 pilgrims had arrived, in a period representing 8 months of the Persian year, which might put the total at about 70,000; and on that day (a Friday) 751 arrived, 200 had left. This, coupled with Eastwick's population figure of 80-100,000, means that during the year the city was receiving a number of pilgrims equivalent to 80% of its population. But this is low in comparison to Curzon's[41] 1889 estimate, of 100,000 pilgrims per year, on a population basis of 45,000 (i.e. about 220%) - but then as the graph shows little relationship between the two courses of population and pilgrims, further speculation would be barren.

Income derived from the burial of corpses had declined during the 19th century, though figures given in 1926 indicate a price per corpse of 1000-5000 rials and bodies were still being exhumed to make room for others as pointed out above.[42] By 1872 however burial within the walls had ceased and land values within the city can be assumed to have become

more 'normal'[43] though the economics of burial have had a long-standing and deep-seated effect on the morphology of the town, still visible today.

7. CONCLUSION

We can see that, particularly over the last 150 years, certain changes and developments have been taking place in the city, some of them perhaps unrelated to the influence of the factors of technological change, or the adoption of western culture and value systems, such as the continued growth (until very recently) of religion in economic and political importance. Others are more directly related to the increasing influence of these factors, namely the change in plan of the city as it has grown west, a superficial manifestation of socio-economic contrasts between the 'old' and the 'new', or the changes in the physical form of the bazar related to more significant and deeper functional differences, which they antedate.

Thus there is established at a very tentative and heuristic level, some possible changes in the recent past which form a stepping stone to the analysis of the present day problems of development and growth.

Notes to text, and references

1. Kutche - a narrow alley between buildings

2. O'Donovan E. 'The Merv Oasis' London, 1882 Vol.II.Chap.XXX.

3. Hussain ibn Ali Akbar 'The heaven of the east' Mashhad 1963 (in Persian)

4. McGregor, Col.C.M. 'Journey through Khorasan' London 1874-5 Vol.I.p.284.

5. Eastwick, E.B. 'A diplomat's three years residence in Persia' 1864. pp.200-233

6. See in particular von Grünebaum, G.E. 'Islam: essays in the nature and growth of a cultural tradition' Chap.IV.London, 1955.

7. Stereoscopically paired air photos at 1:6000, the National Cartographic Institute, Tehran.

8. Encyclopaedia of Islam, entry 'Meshed'. V.Minorsky.

9. Pope, A.U. and Banduin E.E. 'City Plans' in Pope A.U. (ed) 'A survey of Persian Art' London .Vol.II. p. 1391.

10. McGregor op.cit. p.280

11. Encyclopaedia of Islam op.cit. loc.cit.

12. McGregor op.cit. loc.cit.

13. Ferrier J.P. 'Caravan Journeys' trans.W.Jesse, ed.Seymour H.D. 1845. Chap.IX

14. Bassett, J. 'Persia the land of the Imams' pp.221-235

15. Connelly. 'Overland journey to India' London 1830 Vol.I.Chap.I.

16. March Capt. H.C. 'Ride through Islam 1872' 1877 p.p.98-112

17 Goldsmid, Sir F.J. 'Eastern Persia - Boundary Commission' 1870-72 p.194

18. O'Donovan. op.cit. Vol.I. Chap. XXVII

19. Ferrier op.cit. chap.IX

20. O'Donovan op.cit. loc. cit.

21. Chisholm, M. 'Rural settlement and land use', London, 1962. von Thünens' principles of location are discussed in Chapter 2.

22. Khanuikoff N.V. (sometimes incorrectly referred to as Khanykov 'La ville sainte et son terretoire....extraits d'un voyage dans le Kherasan' La Tour du Monde, 1861 2e Septembre. pp.269-288.

23. O'Donovan op.cit. Vol.I.chap XIX

24. Lord Curzon 'Persia and the Persian Question' London 1892, Vol.I.Chap VII

25. Marsh op.cit. loc.cit.

26. Stratil-Sauer G. 'Meschhed' Leipzig 1937 Chp.I.

27. Gibb, H.A.B. and Bowen H. 'Islamic Society and the West' Chap.IV. Oxford 1950. pub.for Royal Institute of International Affairs.

28. Hookham, H. 'Tamburlaine the conqueror' pp.56-7, London 1962.

29. Gibb and Bowen, op.cit. loc. cit.

30. idem.

31. Sjoberg, G. 'The pre-industrial city; past and present' Chap.IV Glencoe, Ill. U.S.A. 1960

32. Lee, S. Rev. 'Travels of ibn Battutha' 1829

33. Clavijo, 'Embassy to Tamburlaine (1403-1406) 'Trans. Le Strange, G., London, 1928.

34. Sjoberg, op.cit. loc. cit.

35. Admiralty Intelligence Division. Admiralty Handbook 'Persia' 1943, p.529

36. Yate, Lt. Col. 'Khurasan and Sistan', p.332, London, 1900

37. Census Office. General Department of Public Statistics, Tehran. Calculation from National 5% sample Survey of Households, 1963. (Details by private communication)

38. Goldsmith, op.cit. loc. cit.

39. Ferrier, op.cit. Chap.IX

40. Eastwick, op.cit. loc. cit.

41. Curzon, op.cit. loc. cit.

42. Seyed Abbas Shah Mansoor Zada 'Mansoori guide to Khorasan, Mashhad, and the Holy Shrine of Hazrat Imam Reza, the eighth apostle of Hazrat Mohammad, the prophet' p.23, Mashhad, 1926.

43. Marsh op.cit. loc. cit.

PART 2. THE SOCIAL STRUCTURE

5. Thesis - development in Mashhad

6. Population densities

7. Demographic structure

8. Literacy

9. Occupations structure

10. Household size

11. Movements of population

12. Income and Expenditure

5. Thesis - development in Mashhad

Until recently, the society and the economy of urban Iran, and to some extent rural Iran, were characterised by a vertical type of structure, with society based on the kin or clan system, and the economy based on small units, hand methods, and specialisation by product, not function. Functional diffuseness was a characteristic of both society and the economy. Today however, economic development and in particular urban growth and industrialisation as well as the adoption of new techniques and cultures (mainly from the western world), all contribute to a situation in which the traditional structures are being replaced by more modern ones, based on horizontal organisation. Society is gradually becoming horizontally divided into a class system, and the economy is being forced to adopt larger units of operation, specialised functionally, with production, for instance, separated from sales and other tertiary functions. In effect this is just one of the ways in which the phenomenon of development can be viewed, and such changes imply also increases in productivity, a rise in per capital real income, a revolution of value systems, and the growth of urban areas, or urbanisation.

It is generally agreed that development, urbanisation and industrialisation are all related phenomena, and that urban centres become an indispensable feature of life as the economy becomes more efficient and begins to develop a need for functions which can only be carried out at central points. At the same time, a more intensive

The Old Town centre from the air.

The New Town centre from the air.

division of labour and the development of rapid transport and communications systems makes it possible for large numbers of people to be gathered at central points, performing secondary and tertiary activities and consuming foods produced by increasingly efficient methods in rural areas.

The urban centre often forms a focal point in development and it is in one such city, Mashhad, that changes in the economy and society, outlined above, are to be analysed. The traditional and the modern, the old and the new, are thrown into close proximity in such a city as Mashhad, as people born and oriented in a traditional life of rural values based on religious authoritarianism are exposed to modernising influences. Evidence of the complex symbiotic relationship between economic and social developments and urban growth is plentiful in the city and is to be analysed in terms of the hypothesis of development outlined below.

HYPOTHESIS OF DEVELOPMENT

It is clear from the air photos of the city, (Plates 7 and 8) that morphologically Mashhad has two more or less distinct parts - an old town, easily recognised by the narrow kutches developed before the use of wheeled vehicles became common, and surrounded by the wall; and the new town, laid out in a gridiron pattern with much more open space and bigger houses. It is the contention held here, however, that these morphological distinctions are merely the superficial expression of much deeper and more important changes, the product of economic and social

developments outlined above.

The old town of Mashhad which was a city founded and developed in the pre-industrial world is now being adapted, to some degree, to the far-reaching changes in its technical and cultural environment. The new town on the other hand is largely a product of changed conditions, since its development dates only from the late nineteenth century, when the city began to grow beyond its walls; and so from its inception, the new town has had features of modern organisation built into it. It is the thesis held here that Mashhad is not one city, but two, divided into two very contrasting parts between which the boundary varies within narrow limits, depending upon the criteria by which the distinctions are being made.

It is hypothesised that the old town, based on the Harram, has a large population, living at high densities, with characteristic demographic features and a social organisation in which the remnants of vertical structure are visible. It is a population characterised also by low standards of literacy and education, limited emancipation of women, a particular occupations structure, low incomes, and a family expenditure pattern based on the demand characteristics which these features of the population generate. The commercial structure of the shops, workshops, offices and other tertiary functions, which exist to satisfy these demands, is thus dependent to some extent on the demand characteristics of this population, measured by its pattern of consumption

expenditures. This plus the more important factor of only limited development in economic affairs - in which vertical organisation and functional diffuseness are still the dominant characteristics - is thought to be responsible for much of the land use structure of the old town, and the continued existence of the bazars.

In contrast to this, the population of the new town is thought to be, much smaller in numbers, and living at lower densities, whilst it is characterised by a different set of demographic attributes and higher rates of education and literacy. Its society is organised much more clearly along horizontal lines, has a different occupations structure, higher incomes, and as a result a very different set of demand characteristics and pattern of expenditure. In response to this, and also as a result of more advanced systems of economic organisation, based more on functional specialisation and the adoption of modern systems of value and technical innovations, the commercial and economic structure of the new town and particularly of its central area, is very different from that of the old town.

The remainder of the thesis attempts to test the validity of this hypothesis by analysing two types of data. Part 2 considers in detail the social geography of the city and analyses the attributes and characteristics of the population(s), and Part 3 is an analysis of the commercial and economic structure of the city and attempts to show the distinctions between the two hypothesised parts of the city, which have arisen partly in response to the social characteristics discussed in Part 2. As far as

possible, and within the limits of the data available, which have deficiencies both in quantity and quality, the analysis of both Parts 2 and 3 is carried out in a quantitative framework.

6. POPULATION DENSITIES

1. Method
2. Comparisons
3. Density distribution in Mashhad
4. Density distribution in theory
5. Mashhad in relation to density distribution theory
6. Conclusion

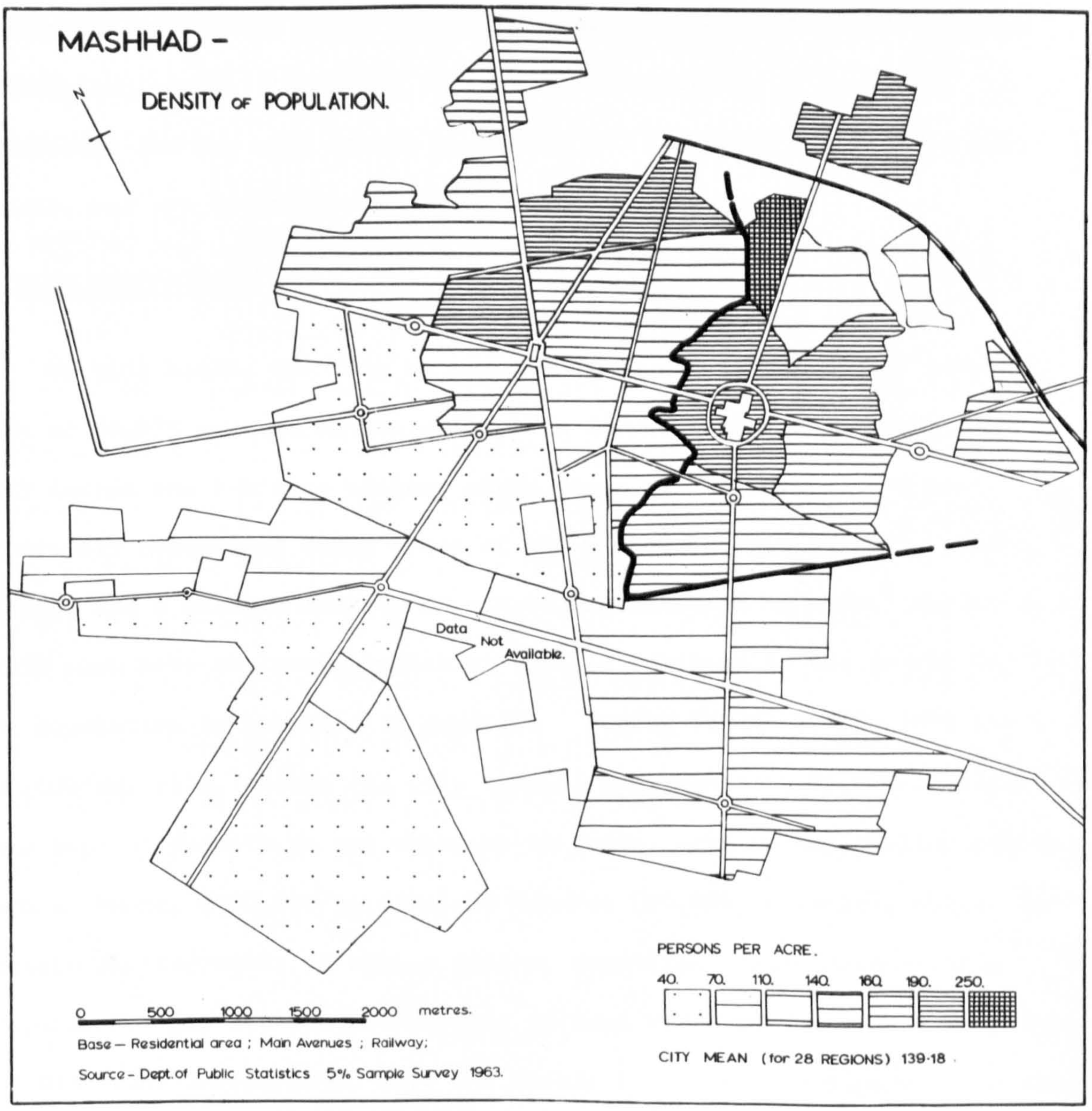
An assessment of the great variation in population density can well be gained from an inspection of the air-photographs of the two major parts of the city, old and new. (Plates 7 and 8). It is the purpose of this chapter to amplify and measure these variations, and to show the relationship between densities observed in Mashhad, and the theoretical rationale of density distribution in cities provided by Clark (1951)[1] and Berry, Simmons and Tennant (1963).[2]

1. METHOD

The map of densities (Fig.11) was constructed from the 1963 5% Household Survey data, and from air photo measurements. (See Appendix A, Table 1) Included in the aerial calculation were residential areas, plus those roads and kutches serving them - thus excluding all other functions as well as the main roads, (commercial and otherwise) marked on the map. This is however only a rough calculation, since because most buildings are multi-functional, separation of functions is impossible without measuring floor-space in square metres. The map is then an indication of gross residential densities, including within it unbuilt private space (house - gardens etc.) and roads and kutches, as defined above. The sample data was multiplied up by the sampling fraction - (in each region c.5%, but the small deviations of +/- 0.1% were accounted for) to give density figures.

The boundaries of the 29 zones into which the city was divided were arrived at by inspection of the air photos, by field work, and on the basis of the results of a pilot survey of households carried out in 1963

Fig. 11.


MASHHAD –
DENSITY OF POPULATION.
N
Data Not Available.
0 500 1000 1500 2000 metres.
Base – Residential area ; Main Avenues ; Railway;
Source – Dept. of Public Statistics 5% Sample Survey 1963.
PERSONS PER ACRE.
40. 70. 110. 140. 180. 190. 250.
CITY MEAN (for 28 REGIONS) 139·18

(details in Appendix C, 2). The size of the zones was, however, strictly related to the fact that they are used throughout the work for sampling, and must each provide (at 5%) a sample population large enough to enable statements to be made about the total population with tolerable degrees of sampling error. Overlays indicating the position of the zonal boundaries and the main street names are to be found at the back of the thesis, and are to be used in conjunction with the maps.

2. SOME COMPARISONS

On this basis, the city as a whole has a density of 139.18 persons/acre or 89,075 persons/square miles. A few comparisons are made chiefly with Indian and Pakistan cities, since these are the better and more accurately documented urban areas of the underdeveloped world.[3] Madras in 1931 had a maximum density of 112,000/sq.mile and as Brush[4] indicates 'this must have at least doubled by 1951 in relation to the growth of the population in the city as a whole'. Bombay Island had in 1951 about 100,000/sq. mile, though the city (gross) mean was only 25,000/sq.mile. This type of density is not uncommon in India, even in the smaller cities, such as Poona, (160,000/sq.mile) and Benares (90,000/ sq.mile), whilst for certain smaller wards of bigger cities, densities reach inconceivable proportions '... 400-450,000/sq.mile in some wards of Calcutta during 1941, and Old Delhi during 1951 '. In the Middle East, density figures of cities are not well recorded and are unreliable. However, Beirut in 1960 had a mean gross residential density of about 107 persons per acre (68,500/sq.mile), whilst Aleppo had only 40 persons per acre (25,600/sq.mile) though the old town area was up to 300 persons per acre (192,000/sq.mile).6

Thus Mashhad, probably in common with other Iranian cities, and possibly with Indian, Pakistani and other Middle Eastern cities, is extremely congested, even on the basis of these summary statistics. A closer inspection of the map, however, reveals details of further interest. (Fig.11)

3. DENSITY DISTRIBUTION within MASHHAD

There is a clear and obvious distinction on the map between the high densities in the N.E. part of the city, chiefly the older parts of the city within the former walls and the S.W. parts of the city, chiefly (but not exclusively) outside the wall, but of recent development. This contrast in density (a max/min. ratio of 6.4:1 between zones 10 and 20), though marked, is not so great as in Indian cities, which record ratios of 300:1 (Benares) or about 100:1 (Calcutta)[7] However, data for Indian cities are available for a smaller unit (the ward) than is the case for Mashhad, - this fact doubtless contributes to the greater ratios.[8]

(i) The Area of older development

The maximum density, 281.5/acre, occurs, as stated, in zone 10 (Nogun) part of the town within the walls, and whilst this region is smaller than those in the east of the city, which causes exaggeration of both the density and of the sampling error, the relative size of the figure is significant. Moreover, this is particulary marked since almost all the houses in the old town are single storey (with a 'basement' perhaps)

Plate 9. The old town centre,looking west from the Harram.

Plate 10. The old town centre,looking north6east from the Harram.

and built on the courtyard system - as discussed in Chapter 4. This implies that the effective area of habitation is very near to the actual apparent ground area, measured from the air photos. This situation is in contrast to that in western and some Indian and Middle Eastern large cities (Beirut, Tehran for example), where multi-storied dwelling units can effectively double or triple the actual available living space. Thus the densities on the map, though not accurate, are at least fairly realistic - and this generalisation applies with some validity to almost all of the older parts of the city east of the line on the map - excepting the central area, around the Harram. This latter has many multi-storied buildings, since it is (as we shall see) one of the two centres of highest land values,[9] - but very few such buildings are inhabited by households, with which we are concerned (Plates 9 and 10). Excepting some of the larger houses belonging to wealthy and more traditionally oriented merchants, a few of whom still live in this part of town, almost all multi-storied buildings are hotels and lodging houses, built to house the many pilgrims who visit the shrine each year. (The central area has in fact c.90% of the pilgrim-housing capacity.)

Thus excepting this central region, the shading on the map represents the minimum residential population of the areas concerned.[10] In effect, when the pilgrim traffic is at its maximum - in the holiday and holy day periods pf Naw Ruz (New Year), on the 22nd March; Ashura, the height of Moharram, the religious month of mourning (in 1964, the second

week in June); and the 48th day of Moharram when the Imam Reza Ali, Mashhad's raison d'etre, died (last day of July 1964); then there are large numbers of extra temporary 'residents' in the Harram area, which becomes extremely congested. Beds are fully occupied in the mussafakhanah[11] at these times of the year, when up to twenty persons may be occupying a single low-class room of four by five metres for example. The general impression of congestion is further increased by the extra thousands who live in the non-licensed (for lodging) premises 'unofficially' making a total of perhaps 50,000 extra residents - a time when the pavements and the shrine yards become the temporary homes of many, and life continues at high pressure twenty-four hours per day, as families sleep in 'shifts'. The density of the central area in these short periods may attain 700 per acre (450,000/ sq.mile).

Another apparent anomaly is the relatively less dense area of Zone 5 (124.5/acre) N.E. of the Harram, in the Nogun area of the older town. This area, for the purpose of the map, was, it is true, included with the small detached new suburb immediately to the east of it - but this can only be a partial explanation of its lower density. It has only 9000 persons, whilst south of it, zone seven (north of Pain-Khiaban) has 15,000 persons in a much smaller area - much of it being composed of disused and abandoned caravanserai, a product of changing land-use functions.[12]

South-east of the Harram in zones 8 and 14, densities are less- due possibly to the existence here of the former Jewish quarter, where bigger

houses and gardens are more common, and the socio-economic mixture more complete. However, both the last two areas would seem to be declining in population (or increasing less quickly than others) - a topic to be examined later.[13]

South-west of the Harram, zone 21, the area of Bazar-Sarshur, is very much one of changing function. At one time, before the advent of motor-transport, and the cutting of the large avenues under Reza Shah, which entailed a revolution in land values, this was an important commercial bazar; but now, decline has set in, and many of the derelict premises are being converted into dwelling units, usually by merchants and others of higher income groups - causing slightly lower densities despite the change from commercial to more wholly residential function.

Partially offsetting this, however, is the fact that to the south of this area (zone 21), near the ditch dug around the old wall, an area of very low land values has grown up - one of several examples of the Iranian equivalent of a 'shanty' town. This is a colony of in-migrants from the south of Khorasan (Qa'aen) who, displaced by agricultural difficulties and the encroachment of the desert, have migrated to Mashhad. This migration has increased as a result of measures of land reform which tend to cause a rationalisation of agriculture, forcing sub-marginal areas and inefficient villages out of existence[14]. Being largely sub-tribal in structure, this group tends to remain isolated living in a complex of contiguous one-room huts four feet high, speaking its own dialect of the Persian language, and surviving at low levels of existence.

West of the line on the map, much of the older part of town has densities lower than those obtaining east of it. These western areas represent later growth, more specialised in their residential functions, - and indeed it is (here) possible to speak of a 'residential area' in the strict sense. Houses tend to be slightly larger and there are more private gardens whilst much of the built-up area grew by expansion into existing commercially productive gardens,[15] resulting in a semi-geometric lay-out.

(ii) <u>The Area of Recent Development</u>

The rest of the city has progressively lower densities towards the west and south, and in the newly built up areas. There are exceptions to this generalisation, however, which must be taken up. Thus to the west, but within the walls N.W. of Meidan-e-Shah, (zone 22), the density figure is 236.1 per acre. This is an area of dense housing which grew up around a village centre, and was later engulfed by the town's growth. Many of the houses are two-storied, since most of the area was built in the early years of this century, by which time more advanced brick-building techniques were more widely known and used. This, coupled with the original village-street pattern of spontaneous growth, contributes to high densities.

Zone 19, in the north of the city, just outside the wall and south of the railway, is in many respects similar to zone 22. Here high density is again evident (246.8 per acre), and although the region is a fairly recent extension of the city (1920-30), the fact of its growth

around the village of Bagherabad, accounts for these higher residential densities. The single density figure available however masks differences within the region - the density in the 'village' area is probably greater and that in former garden area now with bigger, detached houses, less. However, 'explanations'other than those of morphological history are needed to satisfy these more detailed variations, and will be sought later in sections, in terms of the socio-economic-demographic structure of the population.

Zone 9, in the N.W. of the city, follows a similar pattern, and has many affinities with 19 and 22. Although building started in the early twentieth century, growth in this area ceased during the 1950's and early 1960's as land formerly not sanctioned for building came into use in the east of the city in zones 11 and 24. Expansion these latter zones replaced that in the N.W. However, since regions 11 and 24 became fully built up (by 1962-3), expansion within region 9 has resumed - as municipal and shrine records indicate - with a more 'modern' type of housing, though still on the courtyard system. This region is also notable in that it contains, as does the Sarshur area, zone 21, (already noted), a unified immigrant group living in a 'shanty' type of area, on low value land, in this case the exit to the north-western flood channel marked on the map of contours (Fig.5). This group, the Sistani, have been displaced, as have the Qa'aeni, by encroachment of the desert, due to small in-balances in the ecological system of the south - a result of over-grazing, of government discouragement of semi-nomadism, and of the success of the

Afghanistan Helmand river scheme, which has deprived the Iranian part of this basin of some of its water. The accession of the older in-migrants of the group to nearby custom-built houses (zone 9) does not seem to remove this high density 'slum', which fills up with new in-migrants from the same tribe, and thus maintains its size. Like the Qa'aeni, the Sistani form a very isolated and independent sub-cultural group.

However, in general, it is only since 1920-30 that the 'new' type of house, the "Pahlevi" type, based not on a central courtyard, but on a central block surrounded by a garden, has become common: the factors behind this change have been discussed earlier.[16] Thus, excepting region 19, the housing in most areas outside the walls, with a density of less than about 150/acre, chiefly in the south and west, is of the Pahlevi type. Zones 4 and 26, in which the new town central area of Mashhad is located, though only partially within the line of the wall, are included in this.

The suburbs to the east and north (zones 11, 16 and 24), though of very recent construction, have much higher densities, and are in part still built on the 'courtyard' system - in common with the poorer housing of the older parts of the walled town. Zones 2 and 17, in the south-east, again recent suburban extensions, are of fairly low density (136.5 and 147.5/acre respectively), yet are much higher than the areas further to the west, 4, 26, 20, 15, 1, 6 - an important distinction. In effect, houses in 2 and 17 are of the single storey type, and some are still on the courtyard system, in which, as has been pointed out, real density is probably close to apparent density. The houses are of a type of construction and a quality mid-way

Plate 11. A view in the southern suburbs of the city.

Plate 12.A part of the 'New Town' with Pahlevi-type houses.

between those of the older town and its eastern suburbs, and the newer 'pahlevi' type, yet to be discussed. (Plate 11)

This latter type, as indicated, characterises the areas with densities below 150/acre, all built since 1920-30, and in many cases of hard brick or concrete construction, sometimes topped by a galvanised steel roof - an easily identifiable and gleaming manifestation of status in the city. (Plate 12) Within these zones, (1,4,6,15,20,26) the houses are larger and have gardens attached. The 'norm' here is a two-storey dwelling, effectively increasing the apparent living space, and reducing the densities, actually recorded on the map. However, the differences between these regions of the low density group tend to be differences of economic and demographic circumstances, and eannot be discussed in this section. Zone 1, with its density of 94.2/acre, is an exception, the higher figure being due largely to the fact that within it is the former village of Allahabad, (still containing one farming unit), an area of dense housing, which modifies the extremely low densities in some parts of the area, such as 'Kuhe-Doctorha' [17] or Doctor's Street, an avenue of very large well-appointed villas.

Finally zone 3, indicated on the map by the words 'data not available', does in fact have population data but its 'residential area' is not estimable to any reasonable degree of accuracy, as it surrounds the barracks, a region of the town for which neither data, nor air photographs are readily available. In effect it is of extremely high

density, since much of its population (about 8.4% of Mashhad's total household population) is living in specially constructed multi-family units built by the army. It is a special case, consideration of which need not detain us here.

(iii) Summary for Mashhad

The preceding regional account, and its amplification in morphological terms, is, by its nature, a complex one, so that generalisations cannot easily be made. Before proceeding to a consideration of these details in relation to the theoretical rationale of density then, a summary is of some importance. In Table 7, the zones have been grouped together into five main regions on the basis of morphological history, dominant house type, and present density.

Table 7. Density and morphological history of main urban regions

AREA		DEVELOPMENT	HOUSING TYPE	DENSITY Persons/ acre
Region 1.	Eastern walled town Zones 5,7,8,10,14, 21,23,25	Ancient	Courtyard and Caravanserai	150-290 (Zone 5= 124.5
Region 2.	North, North-west and Eastern Suburbs. Zones 9,11,16,19,24	Recent	Courtyard and Pahlevi	150-250
Region 3.	Western walled town Zones 12,13,22,27,28	Old	Courtyard	130-170
Region 4.	Southern suburbs Zones 2,17,18,29	Recent	Courtyard and Pahlevi	100-150
Region 5.	New town in west Zones 1,4,6,15,20,26	Recent	Mainly Pahlevi	> 100

These major regions thus represent crude but basic distinctions between different parts of the city, and, modified by the addition of other factors, are used in later discussion below.

4. DENSITY IN THEORY

There have been two main attempts to set down generalisations about densities, which could apply to all cities of the world. Clark (1951) analysing thirty-six samples from the western world, taken from different periods of time (1801 onwards), showed that

> '.... regardless of time or place, the spatial distribution of population densities within cities appears to conform to a single empirically derived expression:
>
> $dx = do e^{-bx}$, where dx is the population density d at distance x from the city centre, do is the central density, and b is the density gradient indicating the rate of diminution of density with distance, a negative exponential decline' 18

Berry, Simmons, and Tennant (1963) reviewing this paper and others, provide a theoretical rationale, for the western, as well as the non-western world, and show that 'in every place so far studied, a statistically significant negative exponential relationship between density and distance appears to exist'.[19]

The basic theory is that sites in cities offer two goods - land and location and the utility which any function has for these is measured by its ability to pay the rents demanded for them. Depending on function, the most desirable property is thus centrality - resulting in the zoning of functions according to accessibility, with land price and intensity of

land use diminishing outwards. Thus, declining residential densities are predicted. Moreover, the poor will tend to live near the centre, on small parcels of more expensive land, (multi-family dwellings) whilst the rich occupy the periphery, consuming larger quantities of less expensive land - causing per capita consumption of housing to increase outwards from the centre. Since a negative exponential price-distance relationship holds for Chicago, as does the negative exponential decline of densities, Berry et al[ii] assume that 'Equation $d_x = do e^{-bx}$ is a logical outcome of urban land-use theory'. However, this cannot be acceptable as a general theory since the relationship between price-distance and residential density is only demonstrated for Chicago, and the straight regression lines implied are not necessarily the 'best-fit' to a complex distribution.

Thus as a model this is of great use, but it is hypothetical only, and its testing is insufficient to indicate its use as a general theory whilst other functions may be a better fit than this simple exponential. The most interesting implication of the model is summarised in the paper by the equation, $Pm = 10^5 b^{-3}$ (Pm being the population of the metropolitan area) - implying that with the growth of population in a city, the density gradient diminishes, and that smaller cities are more 'compact' than larger ones.

Moreover, by graphing density against distance from the centre for 36 cities in the U.S.A. and 7 cities in Asia, the authors claim to show

that Asian cities are 'more compact' than those of the U.S.A. of the same population size. An enquiry into factors influencing the gradient in relation to central density, using Muth's[20] nine variables in multiple regression, was inconclusive, since size of city explained only 40% of the variance - which means that the implication for gradients (above) and the equation describing their relationship to city size, must also be regarded in a hypothetical sense only.

Conclusive empirical evidence is however provided to show that for western cities, the density gradient diminishes through time and that central densities at first increase and then fall; whilst in 'non-western' cities, the gradient remains constant through time, as the city grows, and central densities continue to increase. Hence 'non-western' cities experience continued overcrowding and compactness though time - this, it is claimed, being due to the lack of social and physical mobility, and inefficient urban transport systems, as compared to western cities.

Finally, the authors show (quoting Alonso 1961)[21] that in western cities the 'rich' tend to live at the periphery on cheap land, consuming large quantities, and the poor at the centre on expensive land, consuming small quantities - much as the theory predicts. However, it is then claimed that the opposite is true for 'non-western' cities using Sjoberg[22] (1960) and others in reference. Indeed, Sjoberg does say that in the pre-industrial city, the rich tend to inhabit the centre, and the poor the periphery - this is in part true of Indian cities today, in which high caste and high wealth are normally correlated - the higher castes occupying the

However, there is a fundamental objection to all this: if in 'non-western' cities the rich inhabit the centre, and the poor the outskirts, then it is implicit, from the negative exponential decline of density with distance , that the rich live at very much higher densities than do the poor, who are supposed to inhabit the 'periphery of degrading and depressing slums'. Now since this implication is nowhere corroborated empirically as yet, and since slums form some of the highest residential densities yet observed (apart from tower-block apartments in western cities), then it follows that either the statement 'the rich live in the centre, and the poor inhabit the periphery' is wrong, or the 'universal' equation $dx = do\,e^{-bx}$ does not apply to 'non-western' cities.

In effect the theory as extended to 'non-western' cities appears to have flaws in both directions. Firstly, Sjoberg's generalisations about 'feudal' or'pre-industrial' cities are on his own admission applicable only to cities of fewer than 100,000 people, since it is stated in his writing that in the past cities rarely exceeded this size, and implicit that today any city above this figure cannot be regarded as 'feudal' or 'pre-industrial'. Yet Berry's examples of 'non-western' cities are all large cities of over 100,000 in India.

Secondly, one of the chief differences between Sjoberg's 'industrial' and 'pre-industrial' cities is in the fact that the residential land uses of the latter tend to be divided up by 'ethnic, occupational, and family ties...' and not in fact according to income group, as is the tendency in

the western world.[24] Now it so happens that in India, caste and income are in a direct relationship (as has been pointed out), so that the equivalent of ethnic and kin ties are in this case correlated with income group. However, this is not the case in the Middle East, where society is organised vertically and family and tribal groupings cut across income lines. Up to the end of the 19th century, the rich and poor of one family or occupational group lived in close proximity - big houses next to small. Indeed this structure still exists today in parts of Mashhad, where it is for instance the normal and religious duty of the rich man of the 'muhallah' to provide the premises (tekie) and refreshment necessary for the observation of certain religious rites during Moharram, the main Shia' period of mourning, in which all the groups whether this be familial or occupational are expected to partake.

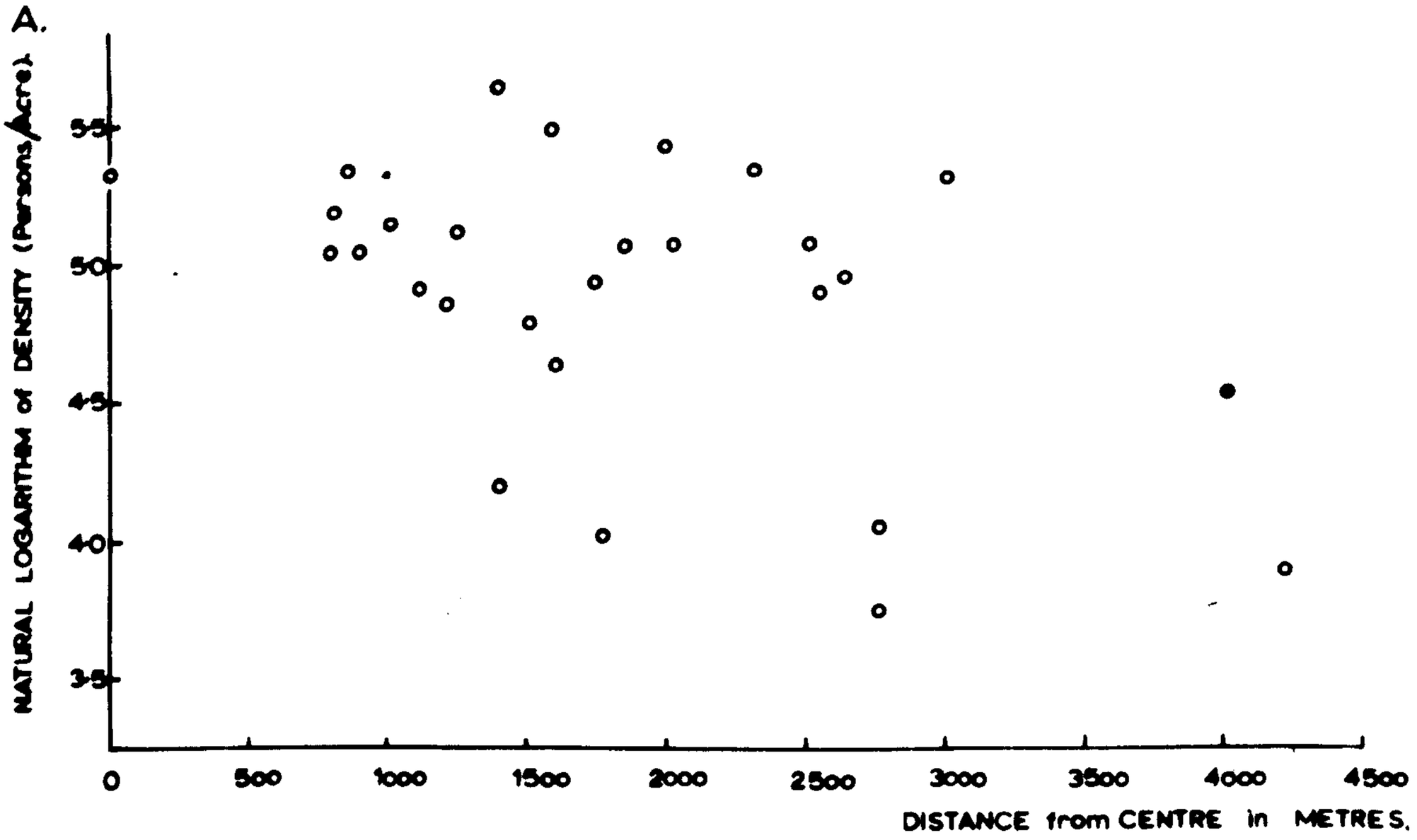
Thus, in using large Indian cities to draw his conclusions, Berry is making an error. The large cities are, by their nature, already becoming 'westernised', and the structuring of the population along income (caste) lines is a special case, relevant only in India, Burma, or Pakistan. These cities are not by any means 'non-western' in the sense of Sjoberg, and his generalisations do not apply to them.

In this case, the fact that the population density gradients of these large cities are, size for size, less steep than in western cities, is to be regarded merely as a modification of the western pattern, and so, if 'western' and 'non-western' are diametrically opposed, as Berry claims, then

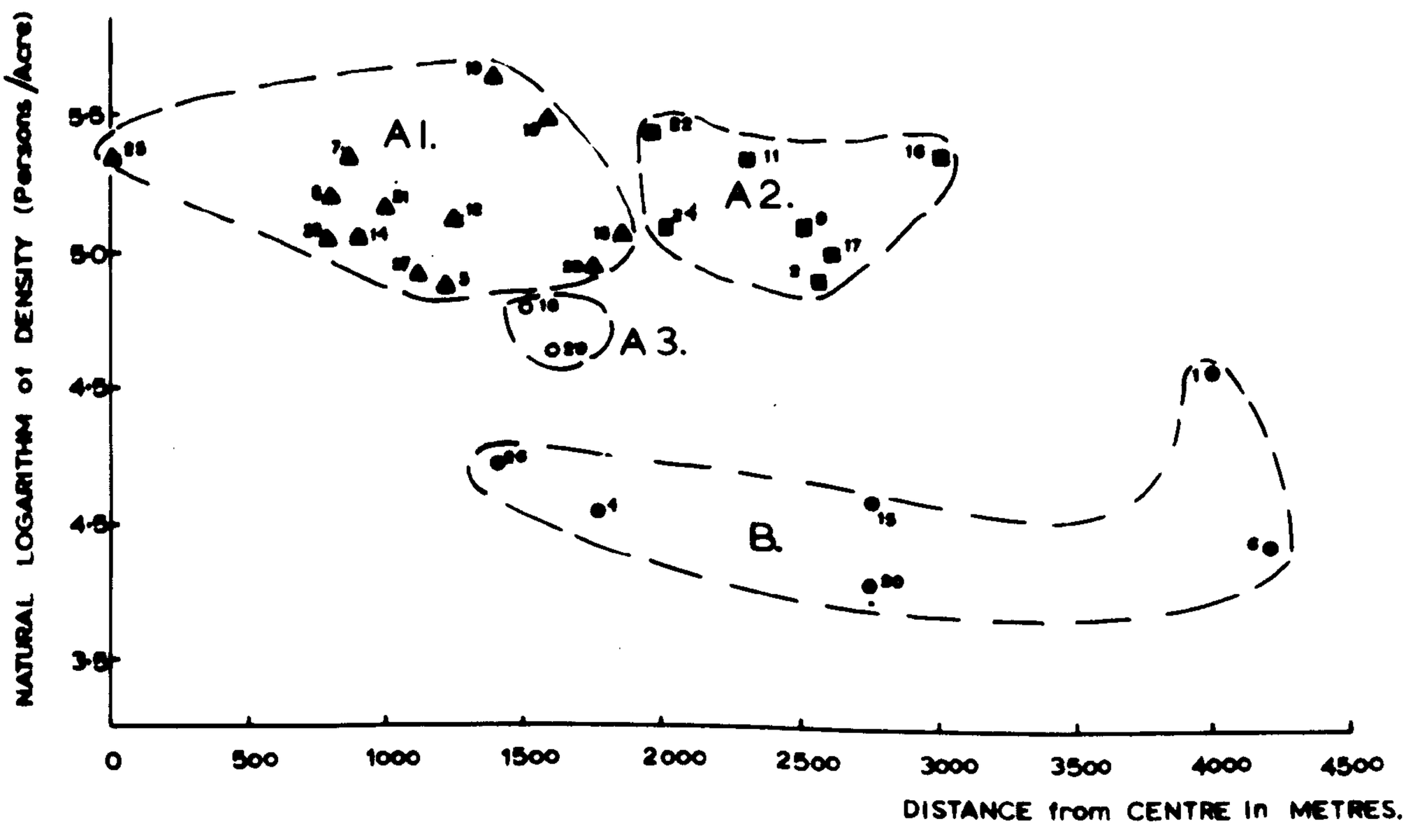
DENSITY-DISTANCE RELATIONSHIP - MASHHAD.

Fig. 12.

A.



B.



it is reasonable to suppose that truly non-western cities (in Sjoberg's sense) if any exist today, might have density gradients even less steep and possibly even locally reversed, if we accept that the 'rich' inhabit the centre, and the 'poor' the periphery.

5. MASHHAD IN RELATION TO DENSITY DISTRIBUTION THEORY

To facilitate comparison, Mashhad's population density distribution is described in the terms which Berry et.al. use. Figure 12A therefore plots the distance from the centre, the Harram central courtyard, to the geometric centre of each of the twenty-eight zones considered, and relates this to the natural logarithm of numbers of persons per acre for each region. The graph has many variations, some due to the fact that gross densities are used, and some to the fact that the regions are large ones. Yet even discounting this, the distribution approximates only very roughly to a negative exponential decline (a straight line). However, the product moment correlation co-efficient of -.622 is significant, and so it is safe to assume that densities do decline with distance from the centre.[25]

However, as Fig.12B indicates (Fig.12A replotted with identifiers of the zones included), the graph has much more relevance and significance than when fitted to a straight line, conformity to which is in some doubt. In B, the divisions of the city, previously considered only in relation to density and morphological history, are changed only superficially when distance is added. Thus all those zones of the walled town previously listed under regions 1 and 3 of the summary (Table 7), appear at the head of

of the graphs as A.1. Many of the suburban extensions of the old town (Region 2) are clustered together within an area of the graph loosely described by A.2., which appears proportionately more densely peopled than its distance from the centre would warrant (in terms of the equation). The zones listed under Region 5 of Table 7 all appear under B, proportionately less dense than their distance from the centre indicates (except perhaps zone 1, reasons for the exception ofwhich have been given). The great gap separating A1, A2 and A3 from B is very marked, and obviously significant - evidence of the relevance of division along these lines. A3 represents a small area (zones 18, 29) part of Region 4 in Table 7, mid-way in its density-distance value between A1, A2 and B. The chief modifications to the summary Table which the inclusion of the distance variable indicates are:-

(i) The distinction between the east and west parts of the older town (Regions 1 and 3 of Table 7) is not as significant as at first appeared, but is still evident.

(ii) It would appear that zone 19, in the north of the old town actually outside the wall, could be more realistically grouped with the older walled town itself (A1), whilst zone 22 in the west, though within the walls, has clearly the density - distance character of a suburban extension of the old town (A2) similar to the two southern zones 2 and 17, which appear to fit into this group A2.

(iii) This leaves zones 18 and 19 as the mid-point between A1, A2 and B, plotted as A3.

For ease of reference in later discussions, these large areas of the city, homogeneous in terms of density - distance, will be referred to as in Table 8:-

Table 8

		% of city population
The old Town	A1	46.1
The old Town suburbs	A2	28.2
The mid Town	A3	4.7
The new Town	B	12.6
(Region 3)		8.4
		100.0

The population distribution between the areas is also indicated.

6. CONCLUSION

The distribution of household population densities in Mashhad is clearly more closely related to the developmental history of the city than to any other factor, whilst distance from the centre, as a corrollary, is of minor importance, and indeed the validity of the exponential negative relationship is by no means certain. It is on the basis of these factors that some attempt has been made to draw up a convenient frame of reference in terms of major divisions of the city, as an aid to further discussion.

If Mashhad is regarded as falling within the universal equation of Clark (1951)[26] and Berry et.al (1963)[27] this must be because this 'law' is ill defined, and can be adapted to meet almost any contingency. Clearly any such 'law', or even general theory is open to disproof by any one exception, and although this is not the main issue here, Mashhad's distribution is only marginally acceptable within it. The main premise of the Berry paper is, in the case of Mashhad, largely irrelevant, since it tells us no more about the city than is self evident, and its sins of omission are demonstrably great.

In terms of the criticisms levelled at the paper, Mashhad must, in common with many of the larger Indian cities referred to, be considered not as 'non-western' in its density-distance structure, but as 'westernised' - a structure much modified from an earlier 'non-western' original, whose nature, even in Sjoberg's terms is as yet obscure. The extent to which the distribution does not conform to the equation is a measurement of the degree of 'westernisation' attained in the social, economic and land-value structure of the city, in response to technological and cultural changes.

Notes to text, and references

1. Clark, C. 'Urban Population Densities' Jnl. Royal Stats. Soc. Ser. A. Vol.114. 1951. pp. 490-6.

2. Berry, B.J.L., Simmons, J.W. and Tennant, R.J. 'Urban Population Densities: Structure and Change' G.R. 1963. pp.389-405.

3. The strict comparability of these statistics is not assured since clear definitions are not given by the authors responsible.

4. Brush, J.E. 'The morphology of India's cities' p.64 in Turner, R (ed.) India's Urban Future' Berkeley and Los Angeles, Univ. of California Press 1962.

5. Riachi, G. 'Beirut' in. Berger, Marroe, 'The new metropolis in the Arab World' pp.102-115. Proc. of seminar on 'The new metropolis in the Arab World' Cairo, Dec.1960. pub. 1963. Allied Pub. New Dehli.

6. Nachate, Chehade,'Aleppo' in Berger, op.cit. p.p.77-102

7. Brush. op.cit. p. 65

8. Smaller Units could not be used for Mashhad for sampling reasons. See Appendix C, 1 and 2.

9. The maximum height is however only six stories (a hotel). Few other buildings are higher than two stories.

10. Survey was in Oct. (1-15) 1963, a time when few pilgrims were visiting.

11. Mussafah-Khaneh a lodging house.

12. Dealt with at length in Chapter 14.

13. ibid.

14. Discussion with Professor A.K.S.Lambton, and Dr. K.S. MaClachlan, at the latter's seminar 'Land Reform in Iran', School of Oriental Studies and African Studies Feb.25.1963. To be published.

15. See Chapter 4

16. ibid

Notes to text, and references

17. Kuhe = street

18. Clark. op.cit. loc. cit. quoted in Berry, op.cit.p.389

19. Berry et al. op.cit. p. 391

20. Muth, R.F. 'The Spacial Structure of the Housing Market' Papers and Proc. of Regional Sc. Assoc. Vol.7.1962.

21. Alonso, W. 'A theory of the Urban Land Market' Papers and Proc. Regional Sc. Assoc. Vol.6.1961.

22. Sjoberg, G. 'The Pre-Industrial City - Past and Present' Glencoe Illinois U.S.A. 1960.

23. Berry et. al. op.cit. p. 390 note 5

24. Sjoberg op.cit. p. 103.

25. Product Moment Correlation Coefficient and test (Appendix B.3)

26. Clark op.cit.

27. Berry et al. op.cit.

7. THE DEMOGRAPHIC STRUCTURE

1. Introduction - growth of population

2. Age-Sex ratio
   - (a) National age-sex ratios
   - (b) Sex ratios in Iran
   - (c) Sex ratio in Mashhad and Khorasan
   - (d) Sex ratio in Mashhad and other cities of Iran

3. Age-sex structure of Mashhad
   - (a) Sex ratio of population over 10 years
   - (b) Sex ratio of population aged 15-34

4. General Fertility Ratio in Mashhad

5. Dependency Ratio in Iran and Mashhad

6. Summary and Conclusion

1. INTRODUCTION

The growth of population in the larger cities of Iran compares with that of other cities in the Middle East, as was seen in the general introduction. Growth in Mashhad city was in the period 1956-63 about 4.1% per annum, from 241,989 persons to about 312,000. This greatly exceeded the national average (2.7% p.a.) for the same period, which is itself high, a product of high fertility and declining death rates. However, the other larger cities of Iran - Tehran, Shiraz, Tabriz, and Isfahan, all grew at a rate faster than Mashhad (Table 9) and, unlike Mashhad, their growth was greater by migration than by natural increase. For Mashhad, the two components were roughly equal, at 2.05% per annum for net migration, and 2.09% p.a. for natural increase. This lower rate of growth for Mashhad is somewhat surprising when one considers its importance as a pilgrimage centre, attractive to in-migrants. On the other hand, its isolation in the east of the country, away from the oilfields with their opportunities for employment, may be a cause of the lower rate of growth. However, this question is more fully dealt with in Chapter 11, on Movements of Population. Mashhad's growth is not excessively rapid, especially when compared to that of Tehran, the capital (7.6% p.a. 1956-63) but it represents a total increase of about 70,000 in the seven year period, almost half of which was made up of in-migrants from Khorasan and other areas of Iran. The population of the city is thus youthful , and many of its individuals are experiencing urban life for the first time. It is the purpose of the remainder of this chapter to discuss some of the main demographic characteristics of this population, and to show the regional variation of these characteristics (within the city).

Table 9

IRAN, SELECTED AREAS, ESTIMATED POPULATION CHANGE
1956-63 in PERCENT per ANNUM

Area	1956 Population[1]	1963 Population[2]	% change
Iran	18,954,704	22,523,039	+2.689
Urban Iran[3]	4,441,481	5,226,290	+3.813
Rural Iran	13,001,141	14,979,633	+2.174
TEHRAN	1,512,082	2,317,116	+7.605
Khorasan	2,007,581	1,894,780	-.803
Urban Khorasan[3]	187,946	241,575	+4.039
Rural Khorasan	1,577,656	1,341,019	-2.142
MASHHAD	241,989	312,186	+4.144
Fars-Banader	1,320,614	1,611,139	+3.143
Urban Fars-Banader[3]	211,411	299,121	+1.197
Rural Fars-Banader	938,531	1,152,297	+3.254
SHIRAZ	170,659	229,761	+4.947
Esfahan-Yazd	1,513,577	1,824,625	+2.936
Urban Esfahan-Yazd[3]	329,561	195,316	-5.819
Rural Esfahan-Yazd	929,308	1,289,400	+5.535
ISFAHAN	254,708	339,909	+4.779
East Azerbaijan	2,142,270	2,701,844	+3.732
Urban East Azerbaijan[3]	254,352	252,309	-.115
Rural East Azerbaijan	1,597,922	2,061,732	+4.146
TABRIZ	289,996	387,803	+4.818

1. Census 1956
2. Sample Survey 1963. Census Office
3. Excluding the respective capital city listed

It is not possible to discuss in detail such vital statistics as birth rate, death rate, and natural increase rate, for Iran, or even for the Middle East in general, since these statistics are almost all under-reported and have gross errors. The Iranian Census of 1956 did not attempt to tabulate births, and though in subsequent sample surveys birth data was recorded, it has been calculated that births were (in the 1963 survey) under-registered by as much as 80% in rural areas, and 35% in urban areas. Thus to quote figures would be entirely misleading - especially as it is probably the case that there are differences between the sexes in the degree to which under-reporting takes place. It is known that both birth and death rates must be high, since the crude percentage increase of population for Iran 1956-63 is about 2.7% per annum (and for the period 1953-7 was, according to the U.N. 3.4% - a figure which is almost certainly too high). However, this implies that the rate of crude natural increase for Iran must be between about 20 and 35 per thousand, and there are undoubtedly rural-urban differences in this. For Iran, growth by natural increase was greater in rural than in urban areas, (Urban Iran, excluding Tehran 2.37% per annum, Rural Iran, 2.82% per annum), and this appears also to be the case for Khorasan - (Mashhad 2.09% p.a., Rural Khorasan 2.49% p.a. Urban Khorasan, excluding Mashhad, 2.20% p.a.[1] This implies that fertility ratios are higher in rural areas (discussed in detail in this chapter), but whether differences exist between urban and rural areas of Iran in terms of birth and death rates, is impossible to say.

There now follows a discussion of some of the more important demographic aspects of Mashhad's population, prefaced by comparison at the national and

regional levels, which provides a background against which the figures for Mashhad can be viewed.

1. AGE-SEX RATIO - SOME COMPARISONS

A. National Age-Sex Structures. (Sex ratio, women per 1000 men).

For most of the countries of the world it is true to say that females outnumber males, but in Iran, in common with some other countries, the reverse is true, and Iran's ratio is only 0.965 (or 965 women per 1,000 men). Table 10 lists some of the countries which have a sex-ratio of this order, derived from the U.N. Demographic Yearbook of 1962. The list is not comprehensive but it does provide an interesting guide.

Table 10. SELECTED NATIONS with 'INVERTED' SEX RATIOS*

Nation	Date	Ratio	Nation	Date	Ratio
Iran	1956	.965	India	1960	.941
Turkey	1955	.956	Pakistan	1961	.900
Turkey	1960	.967	Malaya	1957	.939
U.A.R.	1960	.989			
Iraq	1956	.990	Venezuela	1961	.968
Sudan	1956	.978			
Sudan	1962	.978	Ghana	1960	.978
Libya	1954	.929	Uganda	1959	.991
Libya	1964	.924			
			Canada	1956	.978

* More males than females. Source U.N. Demog. Yearbook 1962

The countries listed include many 'underdeveloped' areas, plus advanced nations, in which immigration is still important (Canada is listed, but Australia and New Zealand have similar ratios). However, in no European country save Albania, nor in the U.S.A., do men outnumber women. Of the countries listed, the Muslim states of the Middle East are represented as are India, Pakistan and Malaya, whilst Africa is represented by Uganda and Ghana. One might hypothesise that the social position of the female in many of these societies may be an explanation of this phenomenon - women are often the main 'bread winners' of the family in agricultural societies (including some tribes of Ghana and Uganda) whilst at the same time being exposed to mortality risks in their child-bearing life, often made worse by inadequate nutrition. Moreover in the Middle East, where male babies are regarded as 'more important', efforts are perhaps directed to their survival, to the neglect of their female contemporaries,[2] whilst families are often terminated after the achievement of a male heir. Finally one might expect that as the female position in society improves then sex ratios may approach unity, or perhaps exceed it, as in Western societies - as would seem to be the case in Turkey for example between 1955 and 1960 (Table 10).

B. Sex-Ratios within Iran.

The larger cities of Iran which are comparable to Mashhad all have sex ratios below 1.000-fewer women than men; however, considering that the country as a whole has fewer women than men, these sex-ratios (excluding Tehran perhaps) are by no means extreme, and indeed the general sex-ratio

is higher for Mashhad than for the rest of Iran (Table 11).

Table 11.

SEX RATIOS IN IRAN, 1956

Area	a. Total Population	b. Population under 65 years	c. 'b' as a % of total
IRAN	.965	.967	96.0
Rural Iran	.977	.981	95.8
Urban Iran *	.956	.955	96.4
Tehran	.891	.886	97.1
Mashhad	.972	.975	96.7
Shiraz	.917	.911	96.2
Isfahan	.953	.942	95.7
Tabriz	.964	.975	95.7

Source - Census of Iran 1956

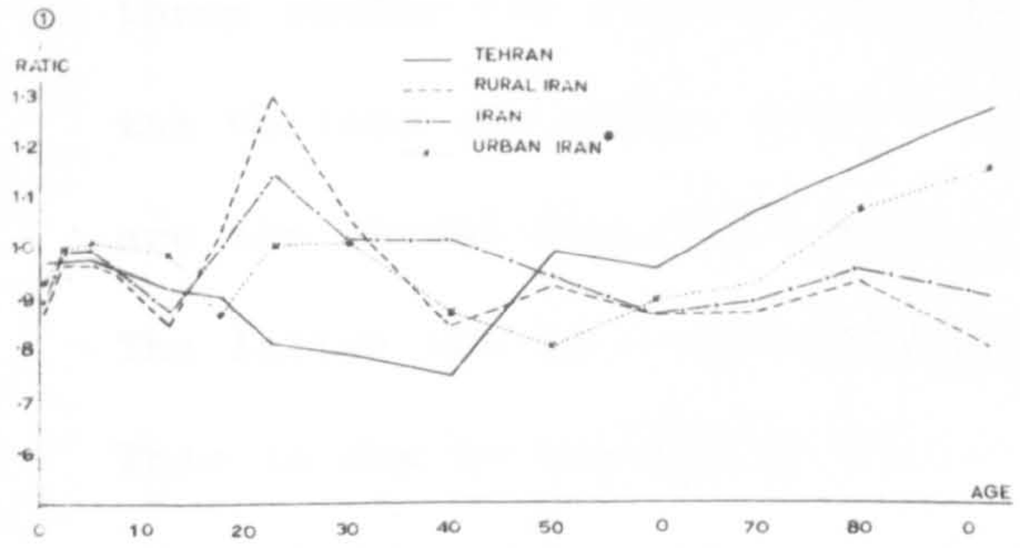
* Census definition of Urban '... all persons living within the boundaries of any place of 5000 or more inhabitants as of the census data'.

This is an important point, perhaps emphasised too little, and applies as much in India as it does in Iran. In Indian cities it is true that sex-ratios are much lower than in Iranian cities, but it is equally true that India generally (0.941) has a lower ratio than does Iran (0.965), whilst a similar situation is observed between rural India (0.963) and rural Iran (0.977).[3]

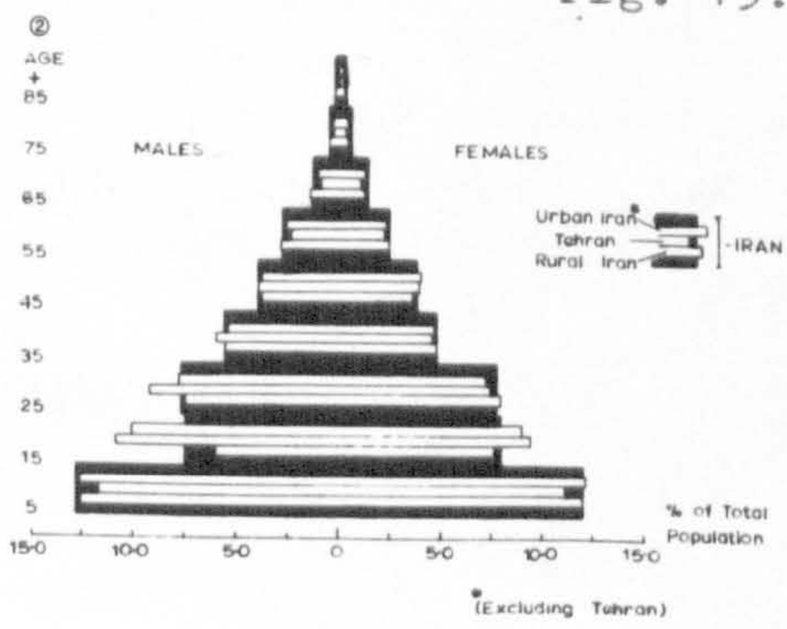
Two sets of diagrams (Fig.13) have been prepared from 1956

Fig. 13.

AGE-SEX COMPARISON — A.

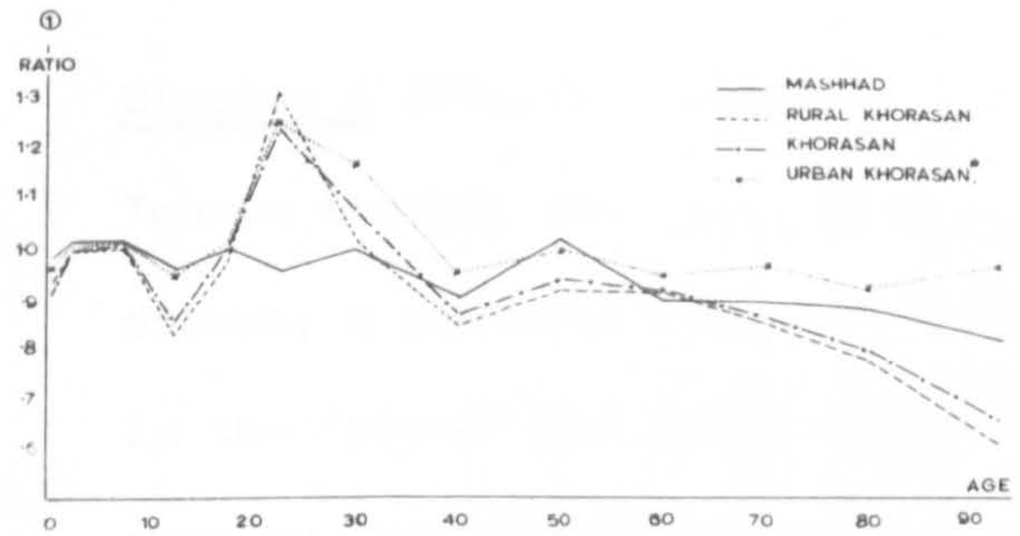


SOURCE — CENSUS of IRAN 1956

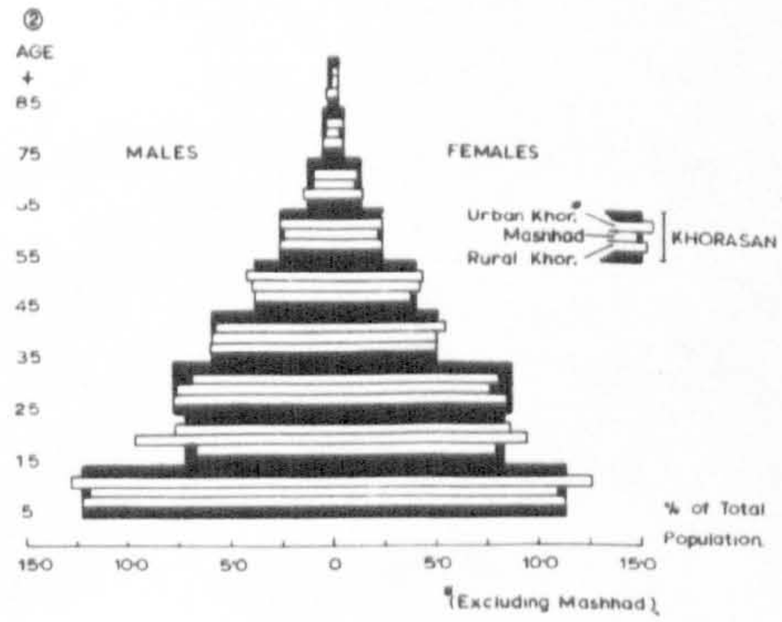


*(Excluding Tehran)

AGE-SEX COMPARISON — B.

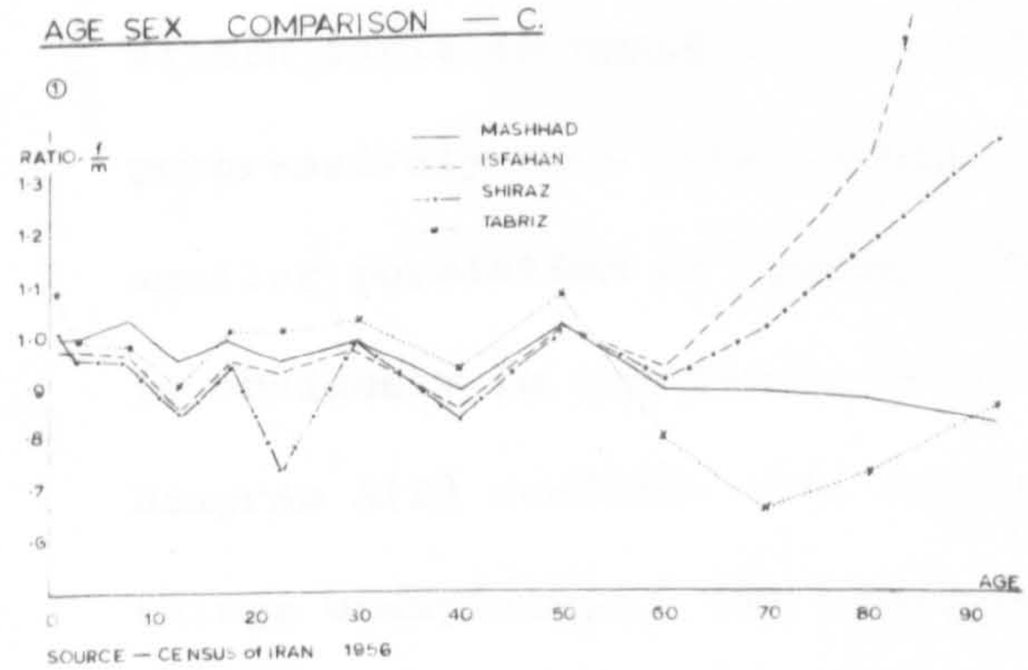


SOURCE — CENSUS of IRAN 1956.

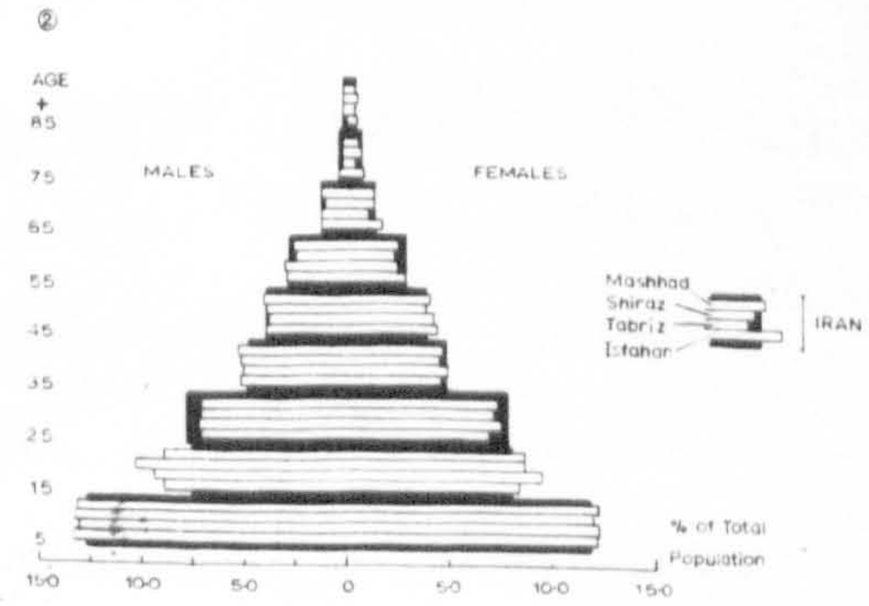


*(Excluding Mashhad)

AGE SEX COMPARISON — C.



SOURCE — CENSUS of IRAN 1956



census material to enable constructive comparisons to be made. The three number (1) figures indicate the variations in sex ratio between the various age groups available, whilst those listed in number (2) are the normal superimposed age-sex pyramids, expressed in percentages. The latter are in a non-conventional grouping:- 5-14, 15-24, 25-35 etc. This is due to the way in which the data was tabulated, whilst the age group 0-5 has been omitted, since mistakes in the registration of births make the latter extremely unreliable.

DIAGRAM A (Fig.13) compares Iran to Urban Iran (excluding Tehran), Tehran itself, and rural Iran. The age-sex pyramid is, as one might expect, a youthful one, with more than 40% of the population of Iran in the 'young' age group 0-14. The population is indeed 'youthful' even by underdeveloped world standards (Egypt in 1947 had 48.1% of its population under 20 years of age, Iraq in the same year, 50.6%).[4] Within table 12 small but consistent variations reveal that the progressively more urban groups selected have more 'adults', and a smaller population of 'young' and 'old' persons. This progression is obviously in the form:- rural Iran - Iran - Urban Iran - Tehran. Diagram A(2) confirms this indication, which, whilst it leaves some things unexplained - the absolute lack of both sexes in the age-group 15-25 for instance, or the excess of females in the group 15-35, for Iran, - does expose some other interesting relationships. Perhaps the most difficult trend to explain is the fact that for Iran generally the sex-ratio tends to decline with age, implying that males are

surviving longer than females, a situation reversed in the urban areas (the graph for Tehran ascends with age) which may be due to the still limited emancipation of women in Iran, in which there are urban-rural differences.

More relevant to this work, perhaps, are the following points:-

(i) For Urban Iran there is a predominance of males in the age group 15-40, with a reciprocal predominance of females in the rural areas.

(ii) This is mirrored, but to distorted extremes, in the situation in Tehran, where the age group 15-40 shows an even greater excess of males.

(iii) In the urban areas generally, but excepting Mashhad, there is an increase in the sex ratio after age 50 as women begin to outlive men - a pattern in contrast to that of the rural areas, but similar to that of the western world. This may be due to the fact that in urban areas women have a better position in society, and are less exposed to hardships than are their rural counterparts. The fact that in Mashhad men appear to outlive women after age 40 may be evidence of a relative lack of emancipation in this religious pilgrim city.

(iv) There is for rural Iran, and also for Iran generally, a peak in the graph in the age group 20-35. This is undoubtedly due to under-reporting of males in this age group because of the threat of conscription. The lack of a/peak in the curve for

Urban Iran, and indeed for all urban areas in Fig.13, is due only to the fact that the identity of males in the age group 20-35 cannot so easily be hidden from the census enumerators as it can in rural areas.

C. Sex-Ratios in Mashhad and its Region (Diag.B.Fig.13)

Diagrams B (1) and (2) show in detail the situation in Mashhad and its surrounding area, indicating that in this particular respect, it is perhaps as much a capital, a 'primate city' within Khorasan, as Tehran is within Iran.

Thus:-

(i) for Khorasan and particularly rural Khorasan (B 1), we see the Iranian pattern repeated, in exaggerated proportions. There is the same peak in the sex-ratio of the group aged 20-35 due to conscription dodging (reaching 1:300 as opposed to 1.292 for rural Iran), reciprocated by the predominance of males in Mashhad, though not in other urban areas of Khorasan, consisting of small towns, mostly of less than 10,000 persons.[5]

(ii) If it is hypothesised that these particular differences in sex ratio are not wholly explained by conscription dodging but also are a function of migration (more males than females), to urban areas, then it would seem to be implicit, as generally noted by Bogue and Zachariah in Indian cities,[6] that migration to urban areas is in direct proportion to the size of the city. Indeed, it may well be that in central places such as are represented in the statistics for urban Khorasan, in-migration is negligible,

even proportionally.

(iii) the absolute 'lack' of population in the age groups 15-25 noted for Iran seems to apply to Khorasan also, and is no doubt due to the under-reporting of males whose identity or existence was hidden from the census officer for fear of conscription.

(iv) the phenomenon of a declining sex-ratio after the age of 50, is present in Khorasan and rural Khorasan, as it is for the country as a whole, since (assuming only limited migration in later years) males outlive females. Again, this situation is less marked in Mashhad, and in other urban areas, where women seem to have a better chance of survival than men, (due to social and perhaps medical factors discussed above). This seems to be a particularly strong point, since in almost all the cases reviewed, sex ratios in the age group 40-50 have a slight rise - marking the end of reproductive life for the female, with a consequent lowering of the mortality rate for this period - this prior to the decline after age 50.

Khorasan, like Iran generally, has a youthful age structure, with 40.7% of the population less than 15 years old (Table 12.B). Moreover, progressive degrees of urbanisation and increase in the size of the city would seem to be correlated, as for Iran, with a progressive decrease in the 'young' and 'old' groups, and an increase in the 'adult' group. Thus Mashhad has 38.48% of its population in the age group less than 15 years old.

D. Mashhad and other Comparable Cities in Iran (Fig.13 Diag.C.)

Diagram C (Fig.13) compares the cities of Shiraz, Tabriz and Isfahan to Mashhad. All these are fairly large cities of ancient establishment,

unaffected by the recent urban growth due to the oil industry in certain parts of Iran (Abadan, Ahwaz). All were over 150,000 in 1956.[7] Up to the age of 60, the sex ratios are very similar, excepting the decline in the age group 20-25, for Shiraz, which is difficult to explain.

However, after the age of 60, the ratios diverge remarkably. Mashhad's is fairly constant, declining somewhat, whilst that of Tabriz declines to the age of 70, and then ascends again (as presumably women begin to outlive men). However, ratios in both Shiraz and Isfahan increase steadily after the age of 60, indicating a greater mortality rate for men than for women after this age. This assumes however that there is little or no migration of persons in these later age groups, and since the actual estimation of age is difficult above 60 little reliability must be placed on these observations. However, perhaps one can say tentatively that the 'norm' is more likely to be on the Shiraz-Isfahan pattern (as for Tehran and urban Iran) than for either Tabriz, or for Mashhad.

All the main cities in Table 11 except for Mashhad and Tabriz have lower sex ratios than Urban Iran, whilst Tehran has of course the lowest (.891). Mashhad and Tabriz in this case seems to be somewhat abnormal, having proportionally more women than Iran generally. Assuming that conscription dodging does not explain all this discrepancy for Mashhad, it may be that many of the hypothesised in-migrants are women, and the inbalance of the sexes of in-migrant groups is not so great as at first might be assumed. For Indian cities after about 1940 this was apparently the case, as Bogue and Zachariah[8] have shown, when early, predominantly

male migration was replaced by a more evenly balanced male-female group as families came to join husbands, or other families already established.

Lastly, perhaps, one main observation needs further emphasis; the graphs of the age-sex ratio almost all slope down from the left to the right, so that as the ageing process continues, men seem to survive longer than do women. It is hypothesised that this, plus the resultant fact that in Iran there are more men than women generally, is partially due to the low position of women in society, who are exposed to long periods of hard work which in western social systems would be the functions of the male members of the family group. Where, as in some of the larger cities, this trend is reversed, we may well be witnessing an aspect of the process of emancipation of women, along with increased availability of medical care, and contraception. The re-orientation of social value systems, requiring the male members of the family to be the chief 'breadwinner' (often in factories) thus relieving the woman of some of her toil, may be a corollary. The fact that the trend is not reversed in Mashhad may also then by of significance, - an indication of the low level of emancipation in this important religious centre, where value systems are likely to change less radically and less swiftly than in Tehran, for instance.

2. THE AGE-SEX STRUCTURE AND OTHER DEMOGRAPHIC CHARACTERISTICS OF THE CITY OF MASHHAD.

Having established an adequate background of comparison, it is now possible to turn to Mashhad itself, using the data from the 1963 5% sample

survey of households to indicate the spatial variation of age-sex structure across the city.[9] The difficulties of maintaining zones of the city at a size small enough to be meaningful, whilst at the same time keeping the zonal sample totals high enough to avoid large sampling errors, are critical here, for if sampling errors are great then any deductions about the total population based on this sample population will be invalid. (See Appendix B,1, for discussion) In view of these difficulties, there appeared to be two possible alternatives to the problem of excessive sampling errors:-

(i) to combine the twenty-nine zones available into a smaller number of larger zones, creating larger sampling groups, and allowing a reasonable amount of valid deduction - but this prejudges the issue, creating boundaries before a consideration of differences and similiarities allows this to be done.

(ii) to retain the regions as they are but to combine together the age-sex groups (producing a larger and more reliable sample sub-total) in the framework of ratios previously defined. This can give at least a reliable series of comparative measurements, even if the latter have little value for inter-city comparison (already carried out). This is the more satisfactory method and was adopted where possible, the ratios defined being:-

(a) sex ratio, $\frac{\text{females over 10 years}}{\text{males over 10 years}}$ - an adult ratio, since data were not tabulated (and in any case are inaccurate) for the group under 10 years.

(b) sex-ratio of the age group 15-34, to determine possible inbalance in the sex ratio due to hypothesised in-migration.

(c) general fertility ratio, of $\frac{\text{children under 10 years}}{\text{women 15-44 years}}$ This, a generalised measurement of fertility, is inadequate in that the age group of children used (0-10) is too large - but data for the more conventional group (0-5) were either not available or had gross errors in them.

(d) dependency ratio, of $\frac{\text{population 0-14 and over 65}}{\text{population 15-65}} \times 100$

This gives the number of dependents per 100 adults of working age.

For each component of each ratio, the sampling error was calculated for each zone of the city, assuming a binomial distribution (Appendix B,1). The Zones in which the errors were too great (above +/-4%), were then combined together. There appear to be differences between the zones in respect of the numbers of males and females represented, but these differences may be illusory. Clearly the distribution of the sexes is partially related to the total population of each zone, but there may exist real differences between the zones. To decide which of these possibilities is the most probable one, the chi-squared test was used (Appendix B,2). A null hypothesis was set up, postulating that the distribution of males and females is in each zone proportional to the total population of the zone, or in other words, that the ratio between the sexes is similar in each zone. This implies that any differences observed between the zones are such as could arise by chance or due to errors in sampling. The chi-squared test employed in a 2 x 2 contingency table indicates for each zone, and for the

city as a whole, the percentage probability that this null hypothesis is valid. On this basis, maps were constructed of the ratios, including only those zones which appeared by the chi-squared test to be marginally or significantly deviant from the null hypothesis. Any illusory differences were thus discounted before the maps were constructed. This procedure was carried out for each of the ratios defined above.

A. Sex-Ratio of the Population over 10 years

The sex ratio for the city household population (1963) was 0.989 (similar to that of the 1956 value of 0.972) - a value which would probably be slightly less if data for the total population were available, as in 1956. This value (0.989) was then used as a null hypothesis against which to test the zonal values.[10] This indicated that although differences between regions in respect of the sex-ratio are present, in only seven out of the 29 zones were these differences large enough to be singificant. For the rest, the sex-ratio is so close to the null hypothesis and city mean of 0.989 that the differences could easily have arisen by chance in the random sample. (The detailed results are in Appendix A, Table 2) From this we may conclude:

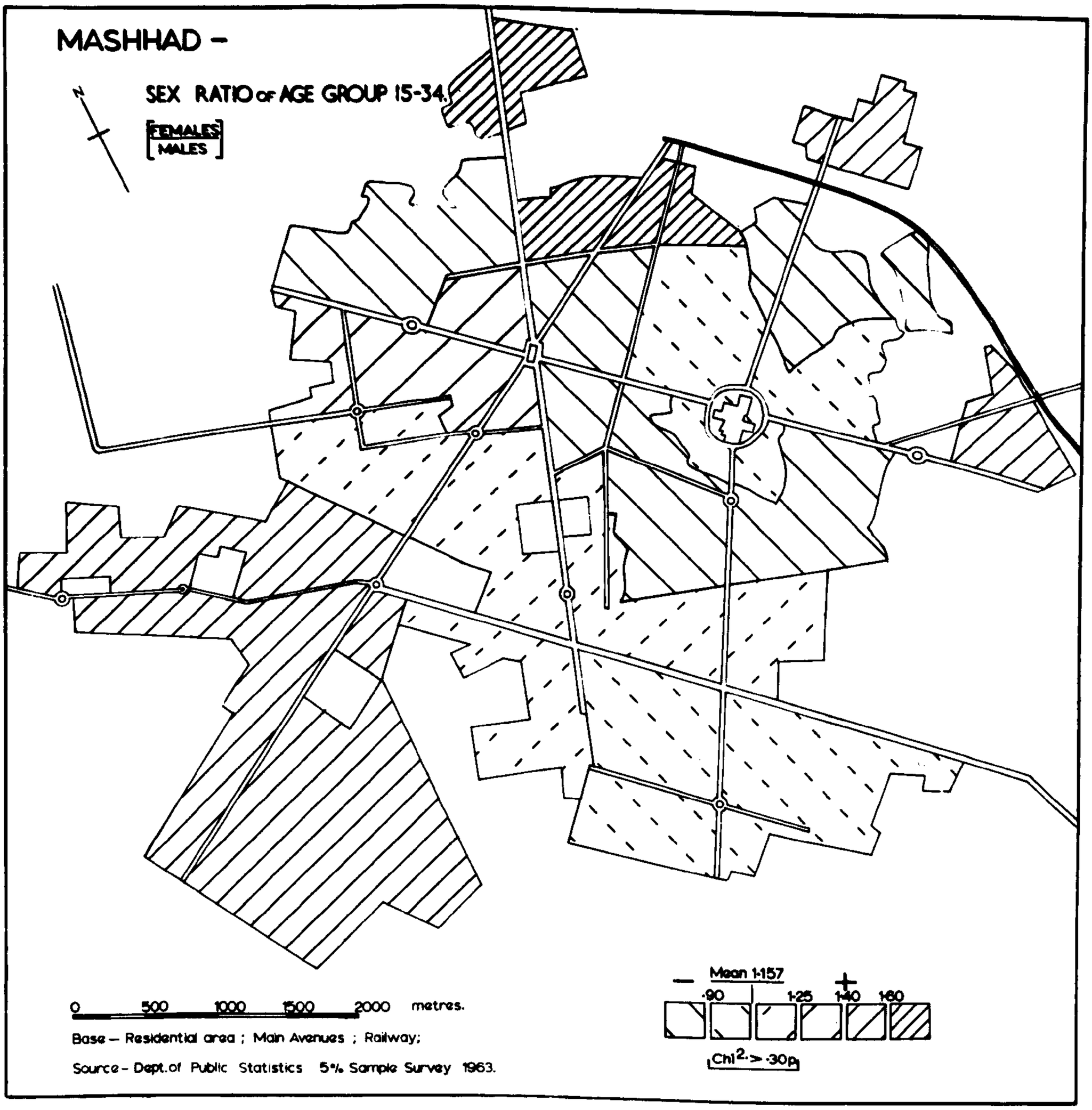
(i) that for this household sample, sex-ratios do not vary significantly through the city.

or

(ii) that the regions are too large, causing an 'averaging' process and so no significant differences are registered.

In either case, the construction of a map would clearly be irrelevant

Fig. 14.


MASHHAD –
SEX RATIO OF AGE GROUP 15-34.
FEMALES
MALES
0 500 1000 1500 2000 metres.
Base – Residential area ; Main Avenues ; Railway;
Source – Dept. of Public Statistics 5% Sample Survey 1963.
Mean 1·157
·90
1·25
1·40
1·60
Chi² > ·30p

and it is sufficient to note the amount of deviation of the significant zones (a maximum ratio of 1.299 a minimum of .746) and perhaps the sign +/- of the others. Thus zones 4,20, 27 and 26 of the new town have a higher than proportionate number of females (ratios greater than .989), but on the other hand, so does region 22, which in other respects shares the characteristics of the old town. Significant negative deviations, indicating a greater than proportionate number of males (ratios less than .989) occur in zones 9,10 and 11 - otherwise associated with the old town. To say more than this would be mere speculation, since our main conclusions must be that in general for the zones selected, the sex-ratios of that part of the population living in households do not vary significantly either for the sample or for the total population.

B. Sex-Ratio of the Age Group 15-34 (Fig.14)

Since the above conclusion is at least statistically valid, it was hypothesised that sex ratios of particular age groups may well vary in terms of some other factors in the general hypothesis, an obvious one being migration (assuming that most in-migrants will be in the age group 15-34)

Since this group (15-34) is smaller than the total sample population, then the sampling errors are correspondingly large (up to +/-11.6%), so that if the 29 regions are used deductions about the total population would not be possible. Consequently the regions were reduced in number and increased in size to 17 in all (by combination based on intuitive assessment). This reduces the value of the map (Fig.14) but does preserve some of its

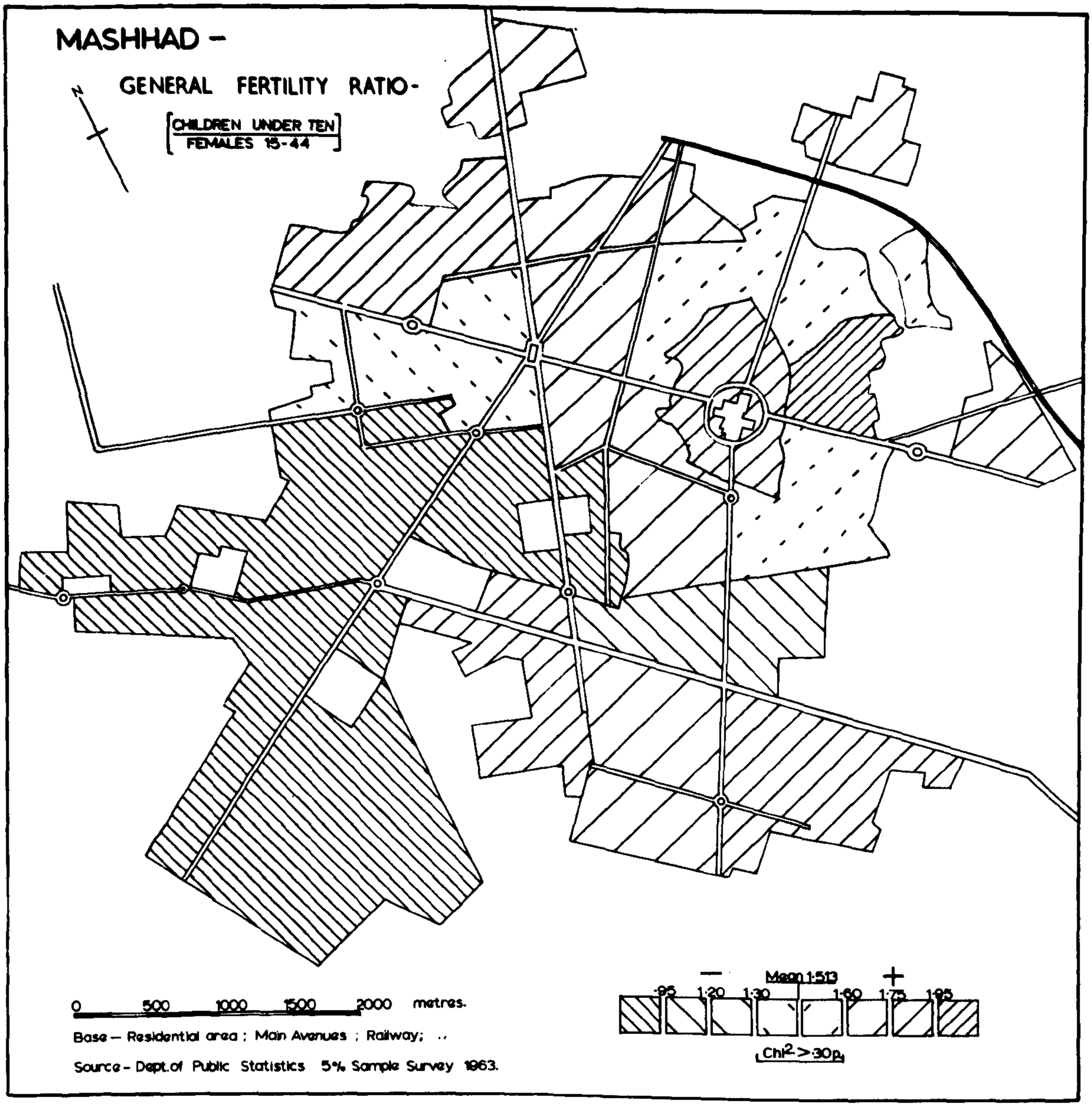
predictability about Mashhad's total household population and reduces the sampling error to a max. of +/-4.4%. The results (Appendix A, Table 3) were then mapped as Fig.14, conclusions derived from an inspection of which are as follows:-

(i) the city mean ratio for age group 15-34 is 1.157, much higher than for the total adult population (.989) and indicating more women than men in the group. This could be (as observed) due to conscription dodging in males but it is thought that this cannot be the full explanation, in which case a lower sex-ratio (more men than women) must apply to the group over 35 years old (as observed in fact for 1956) and to the group under 15 years, which is the 'norm' even for Iran. The inclusion of the larger of Mashhad's 'institutions' (army, prison etc.) predominantly male enclaves, would doubtless change, if not reverse this ratio. This is particularly evident in Mashhad, where lodging-houses, hotels and disused caravanserai are the dwelling places of an exclusively male population, as observed in Chapter 4.

(ii) the regional distribution which emerges from the table and map is instructive. Thus large positive deviations, zones with a greater than proportionate number of females in the household population (ratio greater than 1.157) are:- 6 +1; 22 + 28 + 15; 11 +24; 16 + 19. These represent the central areas of the new town, plus the south-western suburbs of the old town and (16 + 19) the northern areas of the city. All the regions with negative deviations (ratios

below 1.157) - 13 + 21; 27 + 12; 5 + 10; 14 + 18 are in the old town, though not in its centre (the region around the Harram); rather are they distributed around the eastern and southersn sides of the latter. This means that for the household population, whilst there are generally more females than males in the age group 15 - 34, the new town is characterised by even greater ratios, indicating more females and fewer males; and the old town has lower ratios - more males, fewer females. Interpretation of these facts is difficult, since many variables, for the most part not quantified, are involved. If migration is on a similar pattern to that (well documented) of India, then one might expect that in the early stages, migrants will be predominantly male, whilst later in the city's development, this inbalance in the sex-ratio of the in-migrants might be expected to rectify itself as wives and other dependents join their husbands in the city. It would seem however in Mashhad that in-migration is, as yet, at an early stage, so that males might be expected to outnumber females - and indeed the teeming mussafakhaneh and other temporary exclusively male lodging houses, chiefly in the central area (zone 25) would seem to confirm this. The use of caravanserai as temporary dwelling places is especially noteworthy during the harvest season, when the areas along Pain Khiaban take on the characteristics of a 'rural' market, crowded with men from the villages. However, this excess of males, if it does exist, is not recorded in that part of the population living in households, though some male in-migrants appear to be staying with families already established in the city - providing the large negative deviations away from the null in the old town. Further discussion of this problem is deferred until migration can be considered more fully.

Fig. 15.


MASHHAD –
GENERAL FERTILITY RATIO-
[CHILDREN UNDER TEN / FEMALES 15-44]
N
0 500 1000 1500 2000 metres.
Base – Residential area ; Main Avenues ; Railway; ..
Source – Dept.of Public Statistics 5% Sample Survey 1963.
— Mean 1·513 +
·95 1·20 1·30 1·60 1·75 1·95
Chi² > ·30p

3. THE GENERAL FERTILITY RATIO (Fig.15)

As with the ratio dealt with above, since the sampling groups are split up and thus sampling errors increased, (Max.+/-9.8%) it was necessary to reduce the number of zones to the same seventeen as already used, which also facilitates comparison and reduces the sampling errors to less than +/-3%. Again the table (Appendix A,4) and the map (Fig.15) were produced by the procedure outlined, which was repeated here. However, as in previous discussions, it is felt necessary to provide some comparative data in order to make the analysis which follows as meaningful as possible. This is provided in table 13.

Table 13. General Fertility Ratio.[1] Selected Areas, Iran, 1956

Area	Ratio	Area	Ratio
IRAN	1.598	Isfahan-Yazd	1.622
Iran Rural	1.675	Isfahan-Yazd Rural	1.677
Iran Urban	1.494	Isfahan-Yazd Urban	1.566
Tehran	1.260	Isfahan	1.320
KHORASAN	1.449	East Azerbaijan	1.567
Khorasan Rural	1.478	East Azerbaijan Rural	1.640
Khorasan Urban	1.309	East Azerbaijan Urban	1.441
Mashhad.[2]	1.243	Tabriz	1.298
Fars-Banader	1.431		
Fars Banader Rural	1.787		
Fars Banader Urban	1.650		
Shiraz	1.316		

1. Ratio $\frac{\text{Children 0-9}}{\text{Females 15-45}}$
2. Mashhad 1963 (children 0-10) = 1.513
   weighted for children 0-9 = 1.390

Source - Census of Iran, 1956

Here, rural-urban differences in general fertility are clear and again appear to be a useful index of 'urbanity', as rural areas have in all cases high general fertility ratios (above 1.5) whilst urban areas, particularly the large cities have low ratios (generally below 1.5). Tehran has the lowest general fertility ratio (1.260) and rural Iran the highest (1.675). The ratio obtained from the 1963 sample survey for Mashhad (1.319) has been weighted to change the age group 0-10, to group 0-9, in conformity with other figures in the table, and is higher than the 1956 figure (1.243). In fact the 1963 figure should be lower than 1.319, since because of high mortality rates in the group aged 0-10, a depleted number is in existence at the age of 10 and less than one tenth of the group are likely to be of age 10 years. However as a rough comparison of rank, it is adequate. This lower general fertility in urban areas, common in many regions of the world, may be a product of several factors:-

(i) Actually fewer births in urban areas (but this is balanced by a lower mortality rate for women of reproductive age?)

(ii) A lower incidence of marriage in urban areas, due to temporary in-migration of males, who must often defer their marriages (invariably arranged with a girl of their own village area); evidence for this is plentiful in the 1956 census (Table 14)

Table 14

Incidence of Marriage. Selected Areas, Iran, 1956

AREA	Percentage of Population Married			
	Male		Female	
	Age 15-24	All ages	Age 15-24	All ages
Iran	18.8	68.5	61.1	71.4
Rural Iran	22.9	70.9	59.9	73.3
Urban Iran	13.1	65.0	63.7	67.9
Tehran	11.7	59.8	63.0	65.5
Khorasan	48.3	72.1	34.8	69.9
Rural Khorasan	60.9	74.5	23.1	70.3
Urban Khorasan	12.8	68.8	58.1	69.3
Mashhad	13.6	64.6	65.9	68.0
Shiraz	9.1	57.9	64.6	64.0
Tabriz	12.7	62.5	51.6	64.6
Isfahan	12.6	66.1	77.4	68.0

Source - Census of Iran, 1956

For Mashhad, the map,Fig.15, based on the 1963 5% household survey, indicates (as for previous ratios) negative and positive deviations from the null and mean of 1.513 which may be summarised for the significant zones as follows:- (Full results are in Appendix A, Table 4).

(i) positive deviations (more than 1.513 children per female of reproductive age) are in zones:- 2 + 11 + 24; 3 + 13 + 21; 7 + 25; 17, - all of which are situated in, or are sub-urban extensions of

the old town, excepting zone 3.

(ii) negative deviations (reciprocals)indicating lower general fertility, are in zones 1 + 16; 29 + 18 ; 24 + 4 + 26; areas which are identifiable as being part of the new town, and its suburbs, though the zone 29 + 18 classified in Chap.4 as 'Mid' town seems to be exceptional. Again then, there seems to be a continuum, polarised by new town and old town, along which the zones are distributed.

Moreover there appears to be a negative association between this map, and the map of the sex-ratio of the age group 15-34 (Fig.14). This implies that it is in just those areas where general fertility is lowest that the proportion of women in the age group 15-34 is highest, and vice-versa. Thus in the areas in which males are represented more than proportionally, the women have proportionally more children - and these areas seem to be restricted to the old town. There emerges a statistical picture, which largely corroborates the intuitive assessment that for the household population, the old town with small houses has larger numbers of children, and a certain number of independent male lodgers, contributing to the higher densities already noted, whilst the new town, with fewer children in larger houses and without extra males, has lower densities.

4. THE DEPENDENCY RATIO

This ratio is a complex one since it is influences by all other demographic characteristics so far discussed. In general, age is the main variable in the ratio, but dependent variables such as sex-structure, birth and death rates, and the fertility ratios are also involved. For Iran,

the ratio (1956) is 85.6. (Table 15), or 85.6 dependents for every 100 adults, and as one might expect, the ratio is higher in rural than in urban areas, for as seen, there tend to be fewer children and old people in cities, and more adults.

Table 15

IRAN, selected areas, the Dependency Ratio* - 1956

Area	Ratio
Iran	85.7
Rural Iran	89.5
Urban Iran[1]	80.6
Tehran	66.5
Khorasan	79.6
Rural Khorasan	98.8
Urban Khorasan[2]	78.2
Mashhad	72.6
Tabriz	75.2
Shiraz	80.7
Isfahan	75.7

* $\frac{\text{population 0 - 14 and 65+}}{\text{population 15-65}}$

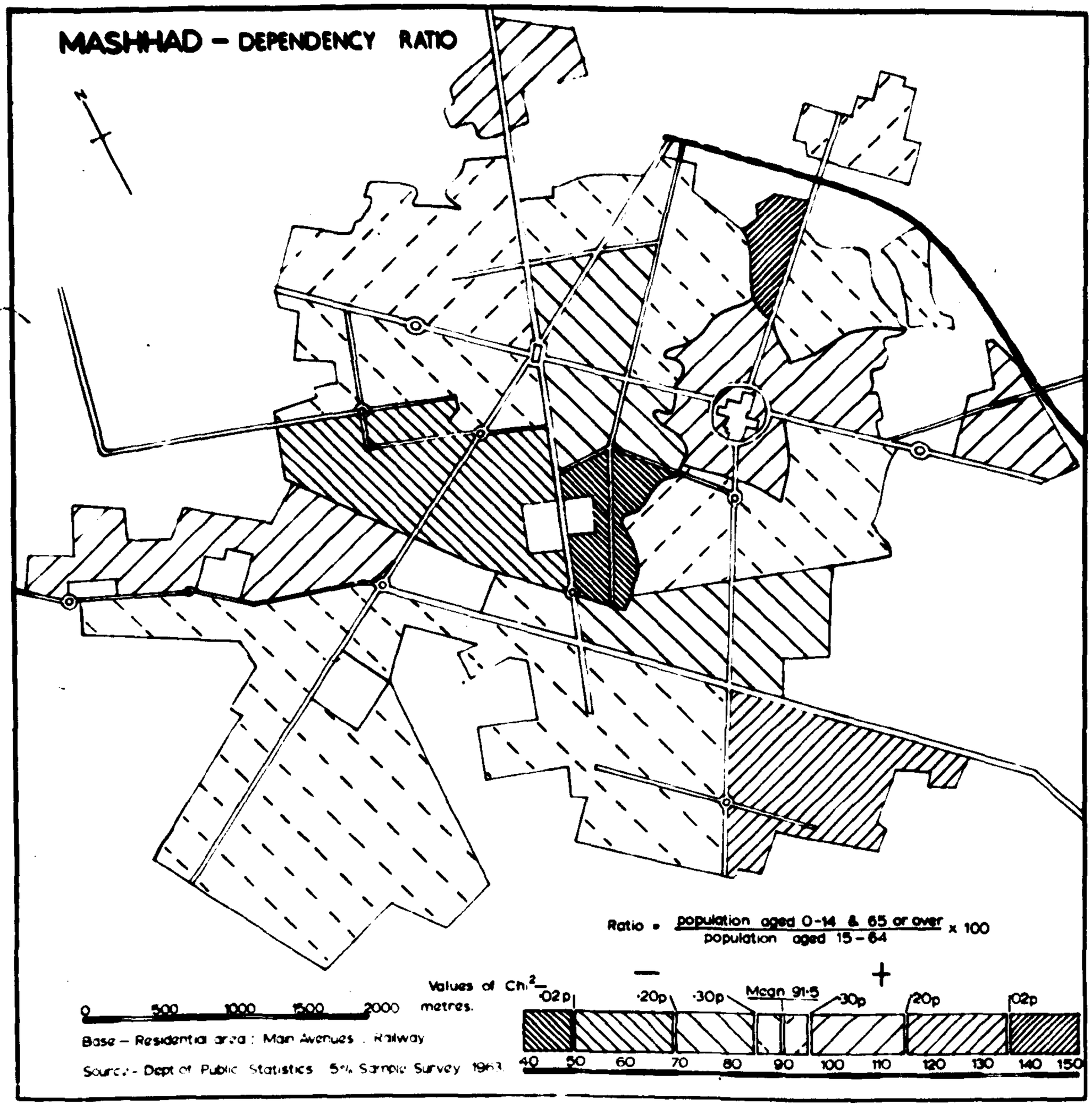
1. excluding Tehran

2. excluding Mashhad

Source, Census of Iran 1956

Rural Iran has a ratio of 89.5, urban Iran (excluding Tehran) 80.6, whilst for Tehran itself the ratio is only 66.5. The same situation is apparent also in Khorasan, but to less extremes, and Mashhad's ratio in 1956 was 72.6. However, the ratio obtained for Mashhad in 1963 (from the Sample Survey of Households) is 91.5, much higher than the 1956 figure. This is because the survey considers only the household

Fig. 16.


MASHHAD – DEPENDENCY RATIO
N
Ratio = population aged 0-14 & 65 or over / population aged 15-64 x 100
Values of Ch.²
·02p
·20p
·30p
Mean 91·5
·30p
·20p
·02p
40 50 60 70 80 90 100 110 120 130 140 150
0 500 1000 1500 2000 metres.
Base – Residential area : Main Avenues . Railway
Source :- Dept of Public Statistics 5% Sample Survey 1963.

population, consisting of family groups in which there are large numbers of dependents. Much of the population not living in households consists however of independent males, many of them recently in-migrated, who are either unmarried with few dependents, or are separated from their families who stay behind in villages. The discrepancy between the ratios is this indirect evidence of this large, independent, non-household population.

In the analysis of the distribution of the dependency ratio throughout the city, it was possible to retain all 29 zones, as sampling errors were not too high (maximum +/-2.8%). The results of the analysis which was carried out as for the other three ratios, are in Appendix A, table 5, and the map constructed appears as figure 16. Of the 29 zones, 14 were, by the chi-squared test, significantly deviant from the city mean ratio, and null value of 91.5. However, the distribution of these zones is complex, and appears to bear very little relationship to the distribution of the ratios so far considered. Large positive deviations are in zones 1, 10, 15, 17, 24, and 25; whilst negative deviations appear in zones 4,7,12, 18, 20, 21, 26 and 27. As the map shows, there is no simple new town - old town distribution here, and negative and positive deviations (low and high values) occur in both new town and old town areas, as well as in the suburbs, and this distribution cannot be explained interms of the general hypothesis. Yet the ratio is by no means proportionally distributed from zone to zone, for the chi-squared value for the city as a whole is high (115.0 at 28

degrees of freedom). The reason for this situation is at least partially because, as pointed out above, the dependency ratio is dependent on many other variables often working in different directions. The old town zones with larger numbers of children per reproductive female might be expected to have higher dependency ratios, but this is offset (except for zone 25 in particular) by the large numbers of independent males of working age, some of whom are in households of the old town. Some zones of the new town, with a higher general fertility ratio and fewer children do tend to have lower dependency ratios. This distinction is not clear, however.

6. SUMMARY AND CONCLUSION

At the general level it is clear that Mashhad shares many of the demographic characteristics of a city of the underdeveloped world with other cities in the Middle East, and India. Growth of the city is fast, (though not as fast as some of the other large cities of Iran), and is roughly divided equally between growth by natural increase and growth by net migration. Whilst there are in Iran generally more males than females, this inbalance is even more extreme in Mashhad itself, as it is in Tehran, Shiraz, and Isfahan, for example, and it is reciprocated by a more evenly balanced sex ratio, or one dominated by females in the rural areas. A corollary to this is the fact that in rural areas the sex ratio tends to decrease in the later years of life as men outlive women, whilst in the urban areas (though not so obviously in Mashhad) the greater emancipation of women and their better position in society is reflected in higher ratios later in life, as women outlive men - a pattern similar to that of the western world.

Urban-rural differences in general fertility are obvious both in Khorasan and in Iran, urban areas having much lower rates than rural areas, and this is reflected indirectly in the age structure and dependency ratio of the population. Whilst Mashhad and its counterparts elsewhere in Iran have relatively few young and old people but many adults, producing a low dependency ratio, the rural areas have many dependents and reciprocally fewer adults resulting in high dependency ratios.

Within Mashhad, some attempt was made to discern the spatial variations in the distribution of demographic characteristics from zone to zone in the city. The general sex ratio (of the population over 10 years old) was not shown to vary significantly. However, the household population of the old town zones, and some of the eastern and southern suburbs which have high densities are characterised by lower sex ratios in the age-group 15-34, partly a product of male in-migration. The old town zones also have higher rates of general fertility, indicating relatively large numbers of children (aged 0-10). From this one might expect there to be a higher dependency ratio in the old town. However, whilst some positive deviations of the dependency ratio are apparent, particularly in the central areas of the old town, the large number of independent males, some of whom live as lodgers in households of the old town, tends to offset the effect of a higher general fertility ratio.

In contrast, the household population of the new town living at lower densities, is characterised by higher sex ratios in the age group 15-34, in which women outnumber men, yet the general fertility ratio is

lower - indicating fewer children per female of reproductive age, a product perhaps of the better position in society held by women of the new town. In general, the smaller number of children per female contributes to the lower dependency ratio observed in some areas of the new town and its suburbs. The dependency ratio is however affected by many variables, and has a much more complex distribution than the other ratios. Its distribution in the city cannot be fully explained in terms of the new town - old town polarity.

Notes to text, and references

1. Figures are from table 30, Chapter 11, where they are discussed in detail.

2. Infanticide of female babies shortly after birth was a practice in the history of these societies.

3. Comparisons with India are the most common international ones made in this section since (with some qualifications) the 'rural-urban' boundary is fixed for purposes of enumeration in both Iran and India, at settlements of 5000 persons. Source of figures, U.N.Demographic Yearbook, 1962

4. Source, Farrag, A. 'Demographic trends in the Arab World' in Berger Morroe (ed.) 'The new metropolis in the Arab World' p.4. New Dehli, 1961.

5. The largest were, in 1956 - Nishapoor 25,820
   Sabzevar 30,545
   Goochan 21,250
   (Census of Iran)

6. Bogue, D.J., and Zachariah, K.C. 'Urbanisation and Migration in India' in Turner, R. (ed). 'India's Urban future Berkeley and Los Angeles, 1962.

7. Mashhad 241,989
   Shiraz 170,659
   Tabriz 289,996
   Isfahan 254,708 (Census of Iran, 1956)

8. Bogue and Zachariah, op.cit. p.45

9. The methodology of the 5% survey is discussed in Appendix C,1.

10. It proved possible to use the 29 zones in this case, because the population was divided into two parts only – male/female and sampling errors were not therefore too large (max.) +/-3.4%.

8. LITERACY

1. Introduction
2. Some comparisons
3. The geographical distribution of literacy in Mashhad
   (a) method
   (b) evaluation
4. Linear distribution of literacy
5. The proportion of female active
6. The distribution of schools - some implications
7. Summary

INTRODUCTION

Education, and the general experience of the population, particularly in relation to changing value-systems, play an important role both as a cause and an effect of the process of urban growth - and this especially in the under-developed areas, where changes in the levels of these factors are most evident. Thus some consideration of the population in these respects is a necessity.

However, a quantitative appreciation of these factors is difficult to attain, since reliable data concerning them are rare indeed. In the case of Mashhad, data on literacy represent the only approximation to 'education' at present available, but in the absence of other types of data they must serve as a substitute, however inadequate they may be.

Of the surveys carried out, only the 5% sample survey of 1963 contained adequate questions about literacy for the population over 10 years old and it is to the analysis of this that much of this section will be devoted. The survey was designed to produce three categories of literacy:-

i. Literate (ability to read and write)

ii. Semi-literate (ability to read only)

iii. Non-literate

However since the second group was in almost all cases extremely small, and since the interviewees were not asked to demonstrate their abilities, it was decided to combine groups ii and iii as the non-literate group.

It would seem that bias may well be present in this sample, especially amongst the socially mobile groups whose personal value systems place the ability to read and write very high; consequently the bias will tend to be in the direction of over-emphasising the rates of literacy in the more literate groups, thus increasing the contrast between literate and non-literate zones. Some appreciation of this tendency is important in the analysis of the data.

Other data include comparative figures on a national and regional scale, and information on the distribution of schools in the city.

2. SOME COMPARISONS

The 1956 Census indicated that only 14.9% of the population of Iran was literate, defined as the ability to read and write a simple message in any language.[1] This figure compares with those of Iraq and Morocco, (10-15%) but is lower than those of some other Middle Eastern states, as Table 16 indicates.

Table 16

COMPARATIVE LITERACY. (Percentage of population ofer 10 years, literate)

Nation	% Literate	Nation	% Literate
U.K.	98-99	India	15-20
U.S.A.	96-97	Jordan	15-20
France	96-97	Pakistan	15-20
		Tunisia	15-20
Spain	80-85	Iraq	10-15
Yugoslavia	70-75	IRAN	14.9 [1]
Lebanon	45-50	Morocco	10-15
Turkey	30-35	Libya	5-10
Syria	25-30	Sudan	5-10
Egypt	20-25	Yemen	1-5
		Aden	1-5

Source. UNESCO, World Illiteracy at Mid-Century, 1957 (Geneva) except 1. Census of Iran, 1956

Within Iran however there are great differences between urban and rural areas and between males and females in these areas, in terms of literacy (Table 17). In Urban Iran 33.3% of the population over 10 years old was literate, and the figures for males (45.2%) and female (20.6%) indicate the gulf between the sexes. Rural Iran however had literacy figures of 6.0% for the total adult population, 10.8% for males and only 1.0% for females. A similar situation holds also for Khorasan, though the figures tend to be generally lower, and the difference between the sexes slightly greater. The Mashhad rates (total 30.9%, male 43.9%, female 17.2%) are roughly comparable to those of other large cities of Iran, though less than the figures for Tehran.

Table 17 Comparative Literacy Iran 1956.
(population 10 years old and over)

Place		Total Population	Literate Population	Percent Literate
A. IRAN				
Total	(T)	12,784,031	1,910,630	14.9
Male	(M)	6,542,181	1,453,676	22.2
Female	(F)	6,241,850	456,954	7.3
B. URBAN - RURAL COMPARISONS				
Urban Iran	(T)	4,186,881	1,396,150	33.3
	(M)	2,172,473	989,887	45.2
	(F)	2,014,408	414,263	20.6
Rural Iran	(T)	8,597,150	514,460	6.0
	(M)	4,369,708	471,789	10.8
	(F)	4,227,442	42,691	1.0
Urban Khorasan	(T)	309,048	89,991	29.1
	(M)	155,984	66,469	42.6
	(F)	153,064	23,522	15.4
Rural Khorasan	(T)	1,084,098	62,877	5.8
	(M)	555,355	59,407	10.7
	(F)	582,732	3,470	0.7

Table 17 (contd..)

Place		Total Population	Literate Population	Percent Literate
C. INTER CITY COMPARISONS				
Mashhad	(T)	175,396	54,229	30.9
	(M)	89,831	39,475	43.9
	(F)	85,865	14,754	17.2
Isfahan	(T)	179,586	58,500	32.6
	(M)	92,127	43,262	47.0
	(F)	87,459	15,238	17.4
Shiraz	(T)	119,625	48,686	40.7
	(M)	62,861	31,335	49.8
	(F)	56,764	17,351	30.6
Tabriz	(T)	208,190	58,904	28.3
	(M)	106,483	45,790	41.1
	(F)	101,707	15,114	14.9
Tehran	(T)	1,104,731	566,537	45.9
	(M)	592,832	325,151	54.8
	(F)	511,899	181,386	35.4

(T) = Total
(M) = Males
(F) = Females

'Urban' = persons living in places of 5000 or more population, 1956

Source - Census of Iran, 1956

Table 18 compares for Mashhad the 1956 figures with the 1963 Sample Survey figures. A large general increase in the proportion of literates is apparent, and in 1963, 52.8% of the total, 60.7% of the males, and 33.6% of the females, were registered as literate. These figures are probably slightly too high, since the survey included only the household population of the city, and was subject to bias, as discussed above. However, whilst the rates of increase are great (by 95.3% for females, by 38.3% for males), apparently three times greater for females than for males, it must be

Table 18

Mashhad City. Literacy, of population 10 years and over 1956-1963

1956	Total	Total Literate	Percent Literate
Total	175,396	54,229	30.9
Male	89,831	39,475	43.9
Female	85,865	14,745	17.2
1963[1]			
Total	206,460	97,500	52.8
Male	103,740	63,000	60.7
Female	102,720	34,500	33.6
Change 1956-63		**Percent Increase**	**Addition of**
Total		70.6	21.8
Male		38.3	16.8
Female		95.3	16.4

1. Note these figures are calculated from the 1963 5% Survey. The sample values were multiplied by the sampling fraction - ($\frac{100}{5}$ +/-.1%) to give the figures quoted.

remembered that the total number of female literates was relatively small in 1956. Consequently, these rates of increase actually involve only a 16.4% addition of female literates, and a 16.8% addition of male literates over the seven year period. The gap between the sexes in terms of proportion literate has thus increased very slightly through the period - in 1956 26.7%, and in 1963 27.1%. This has an important corollary, discussed below.

3. THE GEOGRAPHICAL DISTRIBUTION OF LITERACY IN MASHHAD

It is with the distribution of factors within different parts of the city that this work is chiefly concerned, and the discussion which follows is an attempt to analyse the distribution of literacy, in a quantitative framework.

A. Method

(1) It was decided to concentrate not on the variation of the proportion of males and females within the literate group, but on the spatial variations of the proportions of literates and non-literates within each sex-group individually, and separately for the population (over 10 years) as a whole. Sampling errors were calculated, assuming a binomial distribution[2] for each zone in each of the three main sub-samples - literate males, literate females, and literate total. Most of the errors were less than +/-4%, though a minority were as high as +/-7% - in five zones of the male distribution, and two zones of the female distribution. Since these few larger errors were unlikely to effect the final result, it was felt

justifiable to retain all 29 zones available, rather than condense them into 17 larger ones, as in Chapter 7.

(2) As in the analysis of demographic characteristics, it was thought advisable to test the sample frequencies observed in order to measure the reliability of the apparent differences between the zones. The variation in the number of literates from zone to zone was tested by chi-squared against the null hypothesis that zonal frequencies of literates (male, female, total) are merely proportional to the population (male, female, total) of the zones, any variation being due to chance or to sampling accidents.[3] However, it was not possible to obtain individual zonal values for chi-squared since we are testing against the null, at any one time, only one frequency, and the 2 x 2 contingency table is not applicable. Each of the zonal values is instead treated simply as a component of the total chi-squared value for the city as a whole. This figure tells us whether the sum of the differences between observed and 'expected' values from zone to zone is large enough for us to consider the differences to be real and not due to chance or sampling accidents. A summary of the results is given below, whilst the full results are to be found in Appendix A, Tables 6,7,8.

Chi-squared values for distribution of literates, Mashhad

Class	Value	Probability of validity of null
Males	203.9 (n=29)	< .001
Females	359.2 (n=29)	< .001
Total	506.9 (n=29)	< .001

Since the minimum value of chi-squared necessary to determine the non-validity of the null hypothesis at less than . 001P. is only 56.89, (where n = 29) it is extremely improbable that the distribution of literates by zone in Mashhad is proportional to that of the city as a whole, and equally improbable that the differences between zones could have arisen by chance.

(3) Given this, it was then necessary to determine which of the zones most contribute to the extreme variations in the distribution, and which so little as to be insignificant. This was done by expressing the 29 individual components of the total chi-squared value as percentages of that total, in each of the three distributions, male, female and total. This, the percentage distribution of the component values of chi-squared was mapped as Figs. 17B, 18B and 19B, the percentages being plotted as negative and positive deviations from the null hypothesis. Those zones which have a greater than average share of the chi-squared value (more than the mean of 3.45%) clearly make a significant contribution to the total variation and were mapped as type 'A' in the figures as 'significant'. (The limit was actually lowered to 3.20% to include three other zones, but this does not lower the probabilities of accuracy much, since the chi-squared values are so large in the first place). Zones with between 1.10% and 3.20% of the total were mapped as 'B' - 'marginally significant'. The maps thus indicate those regions whose literacy values must be noted (types A and B) and those (type C) whose values must be ignored, since they could easily have arisen by chance.

Fig. 17 A.

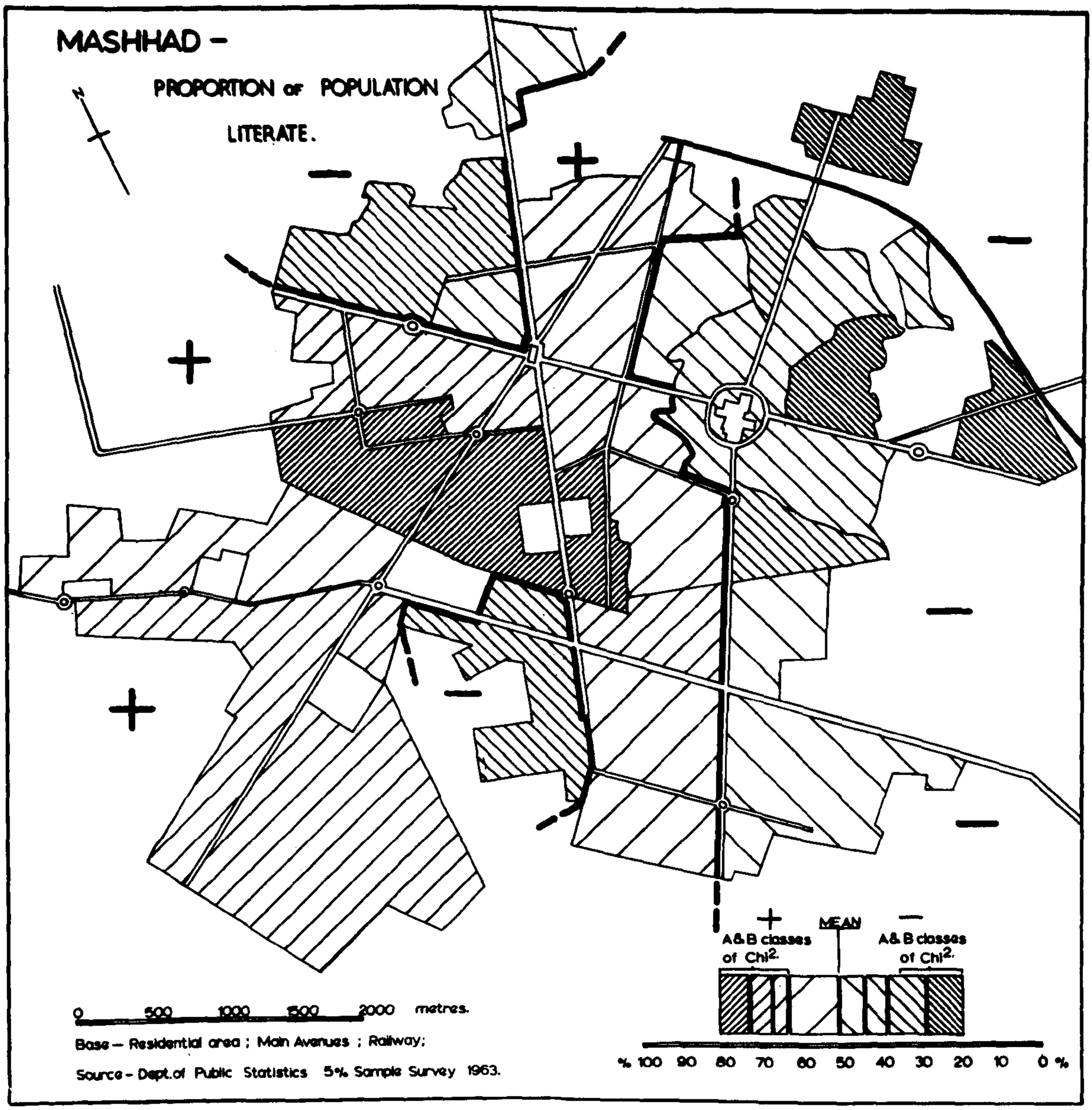
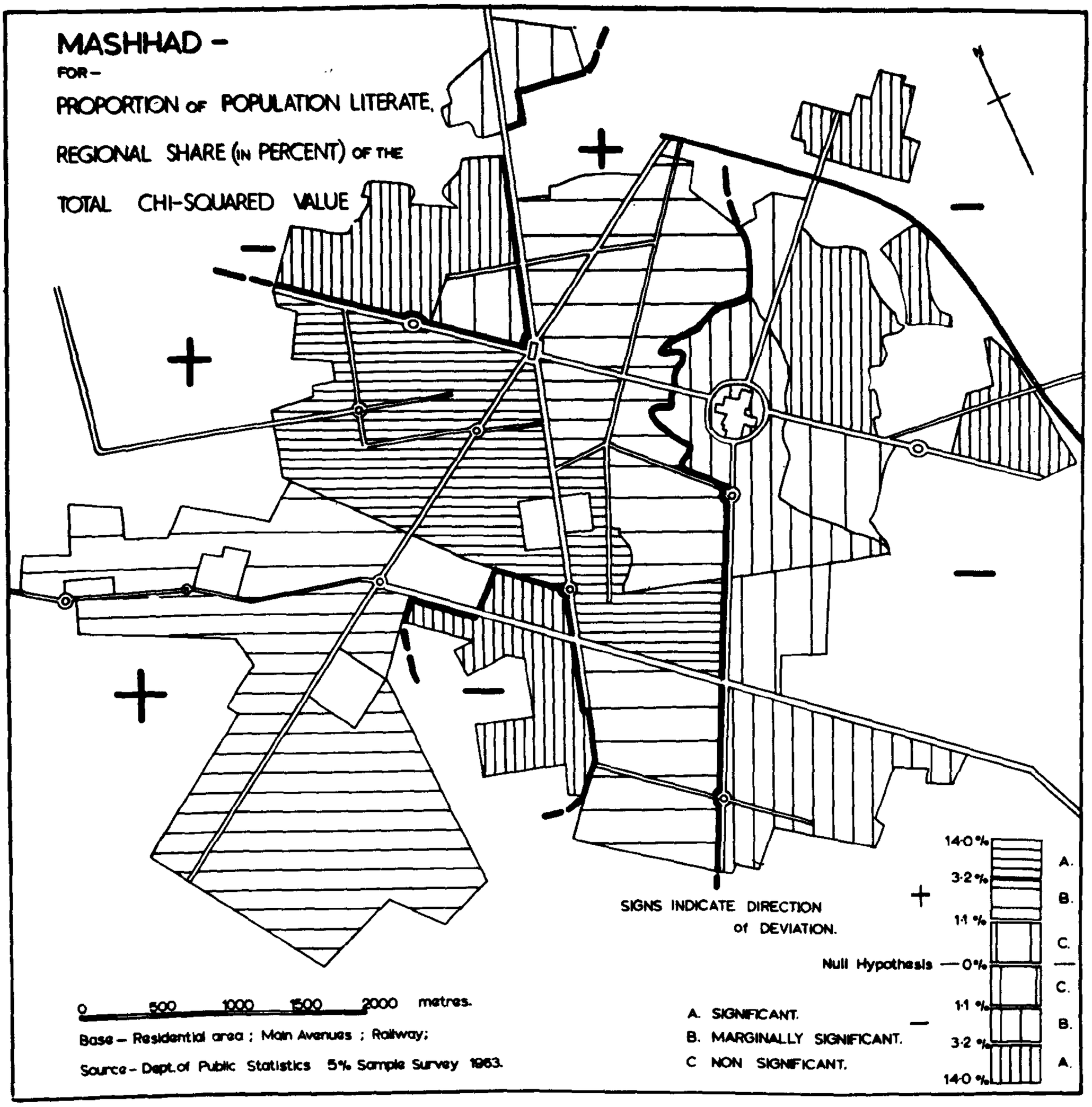

MASHHAD –
PROPORTION OF POPULATION
LITERATE.
+
–
+
–
+
–
+
–
+
MEAN
–
A& B classes of Chi2.
A& B classes of Chi2.
% 100 90 80 70 60 50 40 30 20 10 0 %
0 500 1000 1500 2000 metres.
Base – Residential area ; Main Avenues ; Railway;
Source – Dept. of Public Statistics 5% Sample Survey 1963.

Fig. 17 B.


MASHHAD -
FOR -
PROPORTION OF POPULATION LITERATE.
REGIONAL SHARE (IN PERCENT) OF THE
TOTAL CHI-SQUARED VALUE
SIGNS INDICATE DIRECTION
of DEVIATION.
14·0 %
3·2 %
1·1 %
Null Hypothesis — 0 %
1·1 %
3·2 %
14·0 %
A.
B.
C.
C.
B.
A.
0 500 1000 1500 2000 metres.
Base — Residential area ; Main Avenues ; Railway;
Source - Dept. of Public Statistics 5% Sample Survey 1963.
A. SIGNIFICANT.
B. MARGINALLY SIGNIFICANT.
C NON SIGNIFICANT.

4. Three maps (17A, 18A, 19A) were then drawn of the proportion of the adult population (over 10) which is literate, the key being in strict conformity to the actual grouping of the values along the percentage scale, not adjusted to conform to a geometric or an arithmetic progression. The range of the significant categories of the distribution of the component values of chi-squared (types A and B) is included to enable comparison between each pair of maps.

B. Evaluation of the Maps

Much of the area of all the literacy maps falls in the 'C' class of the chi-squared maps, indicating that the proportion of literates within these areas conforms roughly to the null, or city mean value. Any variations within these areas cannot be regarded as significant, and may have arisen by chance.

For the Total Population map, (Fig.17A) positive values (high literacy zones) are clearly separated from negative values (of low literacy) by the north-south line on the map, which roughly separates also the new town (West) from the old (East). Exceptions to this are two zones of negative values, and low levels of literacy, located in the west. These are zone 3 - the barracks area where illiterate soldiers and their families live, and zone 9, in the north-west, which as een in Chapter 4, has many of the characteristics of the old town, and indeed was described as part of it, particularly with regard to the colony of squatters, the Sistani, largely illiterate, who live there (Chapter 6). Zones 21 (the Bazar Sarshur area) and 13 appear to have positive deviations, yet are in other respects normally associated with the old town. However, many of the

Fig. 18 A.

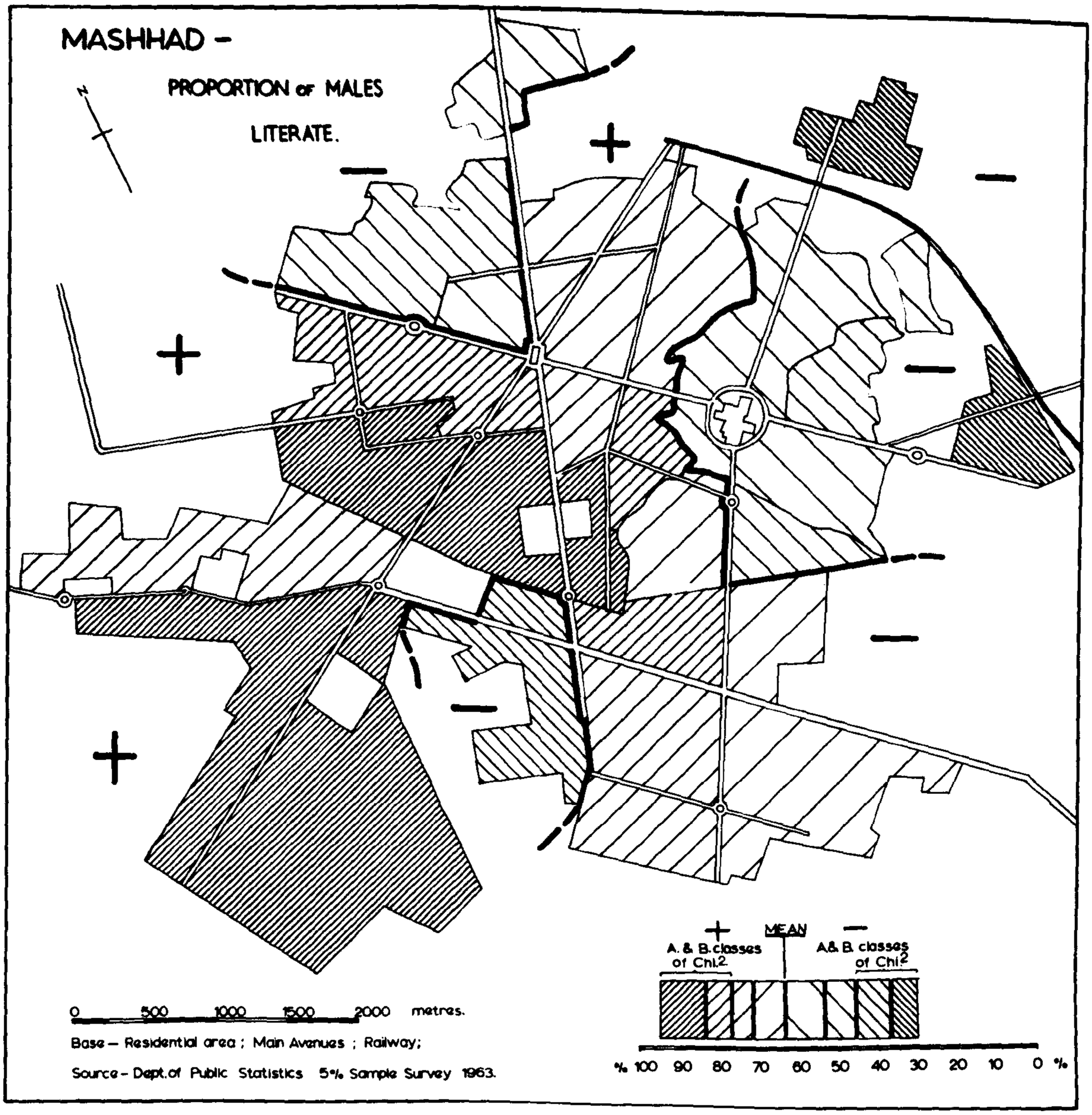
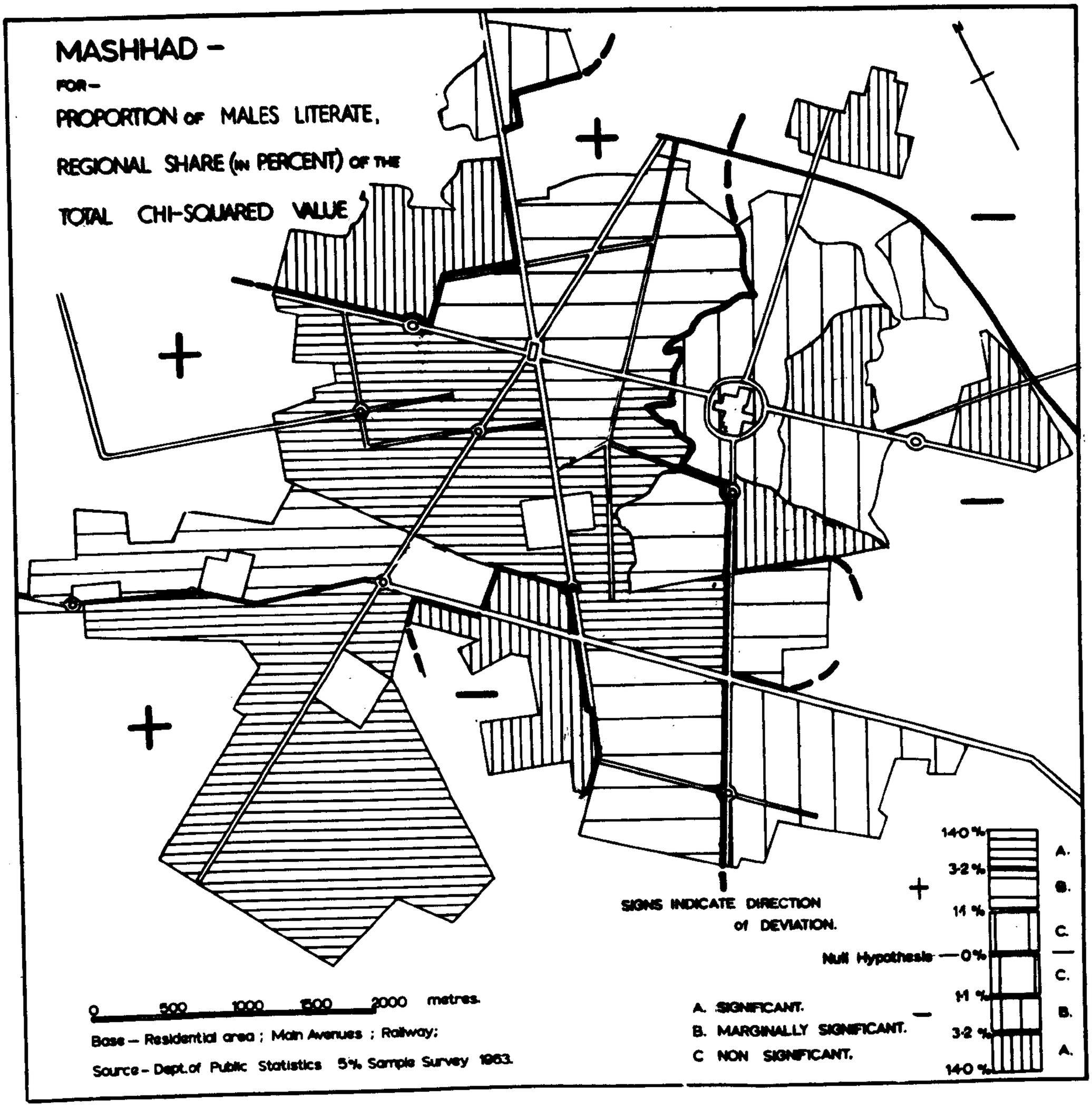

MASHHAD –
PROPORTION of MALES
LITERATE.
+
–
+
–
+
–
+
MEAN
–
A. & B. classes of Chl.2
A& B classes of Chl?
% 100 90 80 70 60 50 40 30 20 10 0 %
0 500 1000 1500 2000 metres.
Base – Residential area ; Main Avenues ; Railway;
Source – Dept. of Public Statistics 5% Sample Survey 1963.

Fig. 18 B.


MASHHAD –
FOR–
PROPORTION OF MALES LITERATE,
REGIONAL SHARE (IN PERCENT) OF THE
TOTAL CHI-SQUARED VALUE
+
+
+
–
–
–
SIGNS INDICATE DIRECTION
of DEVIATION.
140 %
A.
3·2 %
B.
1·1 %
C.
Null Hypothesis — 0 %
C.
1·1 %
B.
3·2 %
A.
140 %
A. SIGNIFICANT.
B. MARGINALLY SIGNIFICANT.
C NON SIGNIFICANT.
0 500 1000 1500 2000 metres.
Base – Residential area ; Main Avenues ; Railway;
Source – Dept. of Public Statistics 5% Sample Survey 1963.

zones along the boundary line have 'C' type chi-squared values, indicating that this boundary is more in the nature of a transition than a sharp break, and other zones such as 18 and 29 (the 'Mid town' of Chapter 4), or 2 and 17, often deviate in their characteristics from one side to the other, displacing the negative/positive boundary to east or west. They are close to the city mean of 52.8%. Maximum values are in the new town central area (zones 4,15, 20 and 26) where up to 80% are literate, and minimum values, as low as 20% occur in the old town zone 7 (north of Pain Khiaban) and in the old town suburbs, zones 11 and 24.

The distribution of male literates (Fig.18A) is basically similar to that of the population as a whole. There is the same general division into positive values of high literacy in the west, the new town, and negative values in the old town to the east. Maximum values 85-95% are in the same zones (4, 15, 20, 26) as in the total population map, and minimum values (30%) are in similar areas of the old town (zones 11 and 24). The same two main exceptions to the general division, zones 9 and 3, are also evident here. The main difference between the male map, and that of the total population, would seem to be that there is a much larger area of positive values in the map of male literacy, which stretches much further east than in the total population map. In fact male literacy is a more commonly held attribute than is literacy generally, and the transition between negative and positive values is displaced to the east.

Fig. 19 A.

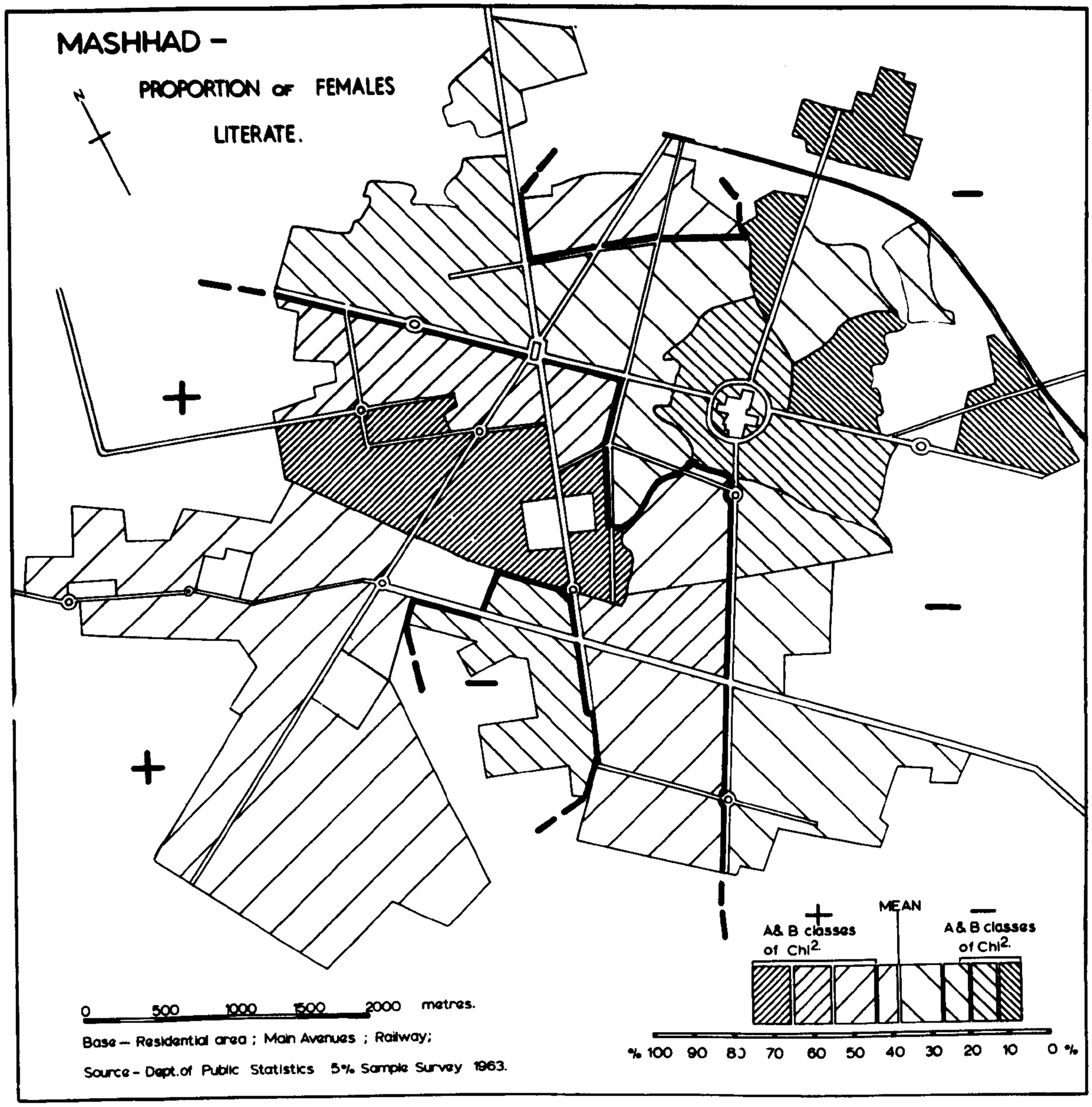
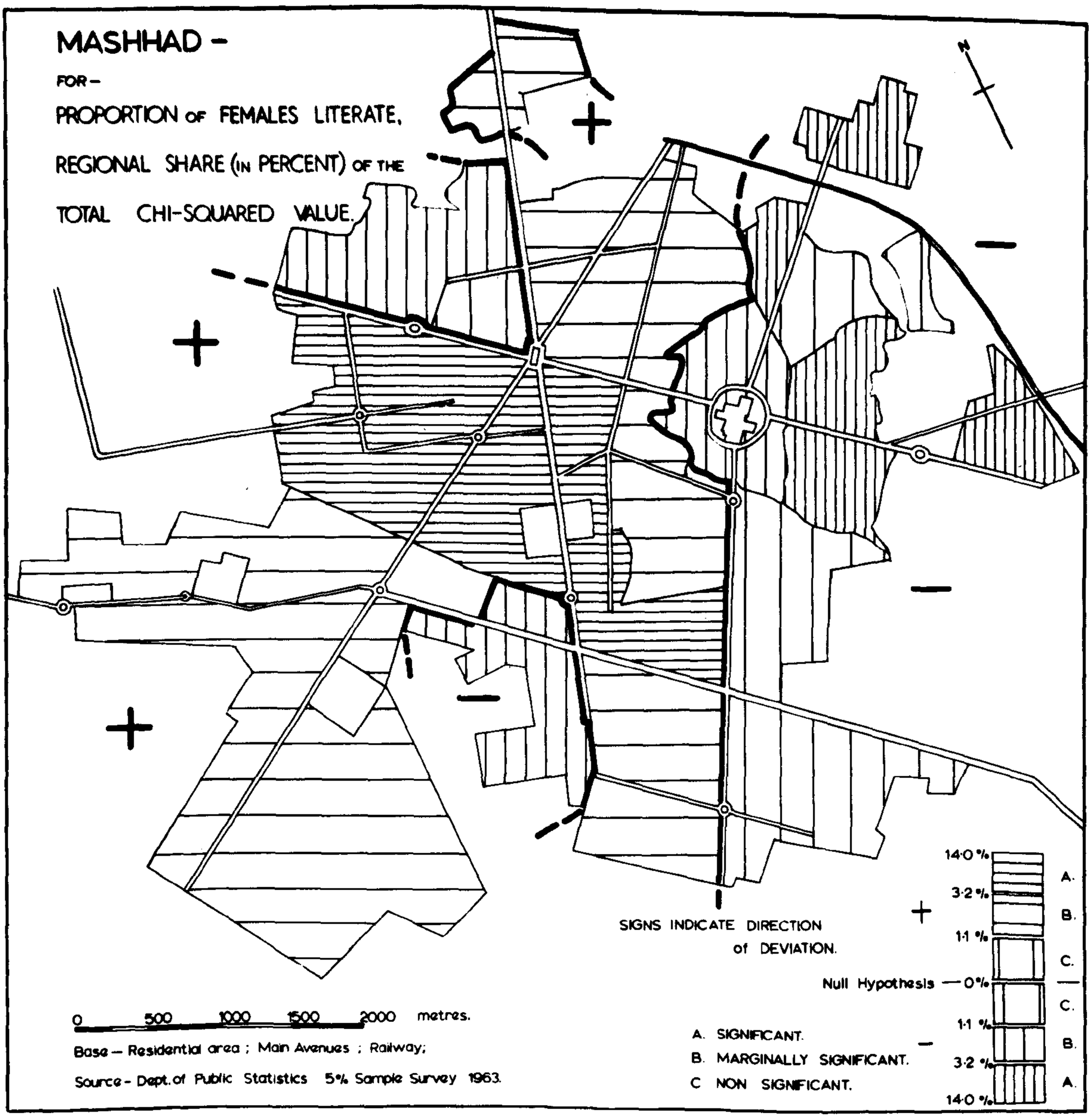

MASHHAD –
PROPORTION OF FEMALES
LITERATE.
N
+
–
+
–
+
–
MEAN
A& B classes of Chi2.
A& B classes of Chi2.
0 500 1000 1500 2000 metres.
Base – Residential area ; Main Avenues ; Railway;
Source – Dept.of Public Statistics 5% Sample Survey 1963.
% 100 90 80 70 60 50 40 30 20 10 0 %

Fig. 19 B.


MASHHAD -
FOR -
PROPORTION OF FEMALES LITERATE,
REGIONAL SHARE (IN PERCENT) OF THE
TOTAL CHI-SQUARED VALUE.
N
+
+
+
−
−
−
SIGNS INDICATE DIRECTION
of DEVIATION.
14·0 %
3·2 %
1·1 %
A.
B.
C.
Null Hypothesis — 0%
C.
1·1 %
B.
3·2 %
A.
14·0 %
0 500 1000 1500 2000 metres.
Base — Residential area ; Main Avenues ; Railway;
Source - Dept. of Public Statistics 5% Sample Survey 1963.
A. SIGNIFICANT.
B. MARGINALLY SIGNIFICANT.
C NON SIGNIFICANT.

The map of female literacy (Fig.19A) is somewhat different from the other two, with the negative area of the map much larger than the positive area, stretching into the west, and including all suburbs except those in the south-west and south. There is thus a high degree of female illiteracy even in those zones which by other measurements appear to be fairly advanced socially. The maximum values, again in the central area of the new town, are only 65-75%, whilst in the old town (zones 10, 11 and 7) literacy amongst females is as low as 7%.

Generally, there are, as might be expected, many similarities between the three maps, with similar areas of high and low values in the new town and old town respectively. The transition between negative and positive deviations which in the map for the total population runs roughly north-south along Kh.Tabarsi, and Kh.Tehran, is however displaced to the west in the map of female literacy, and to the east in the case of male literacy. However the broad basic distinction between east and west, old town and new town, is inescapable, with more literates than proportionate in the new town, and fewer than proportionate in the old.

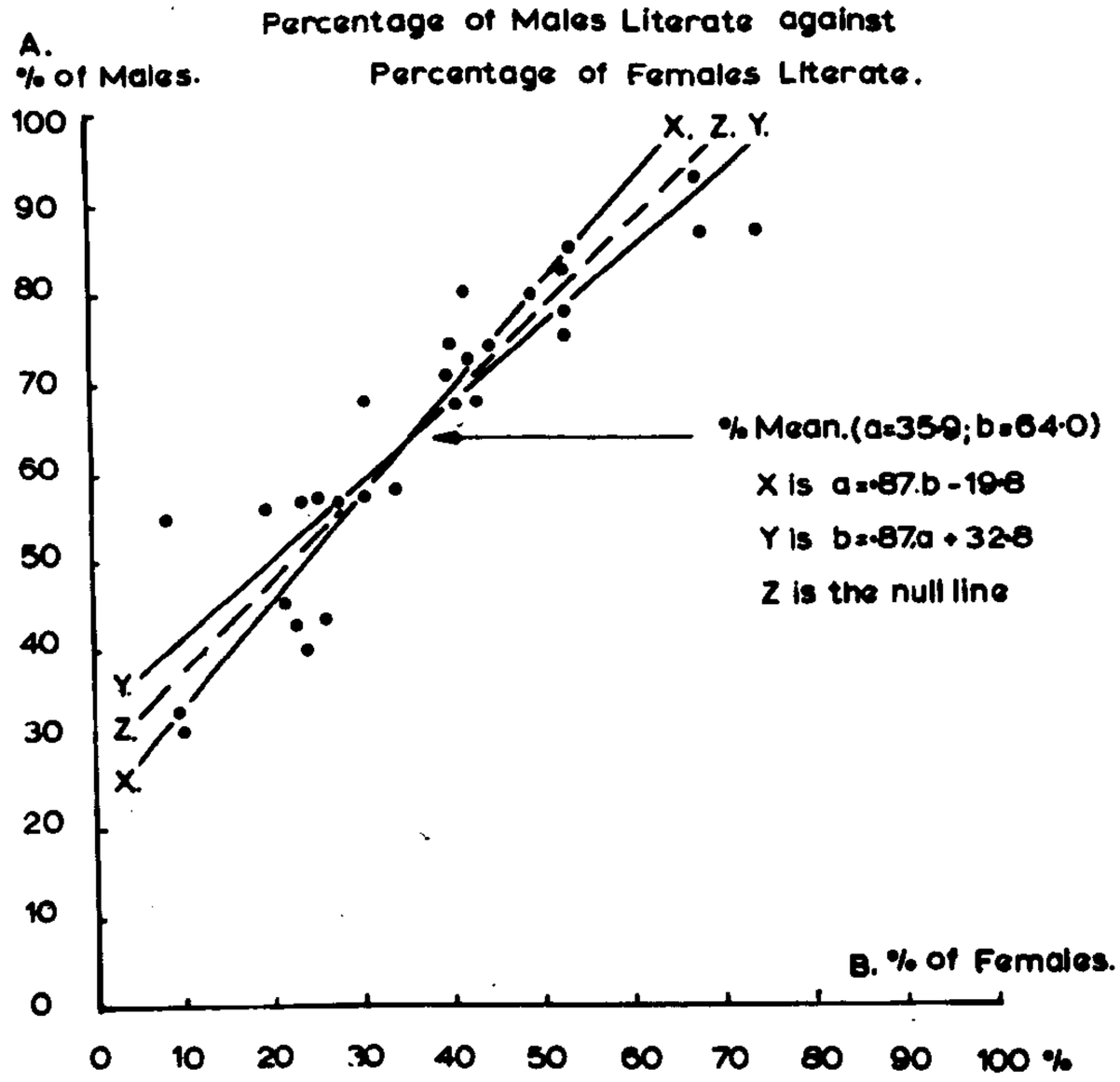
4. THE LINEAR DISTRIBUTION OF LITERACY IN MASHHAD

The differences evident between zones on the map can be seen more clearly and in more detail by expressing them in graph form, and although this does give to each zone equal consideration, without regard to the chi-squared values calculated, the graphs are still useful. Fig.20A

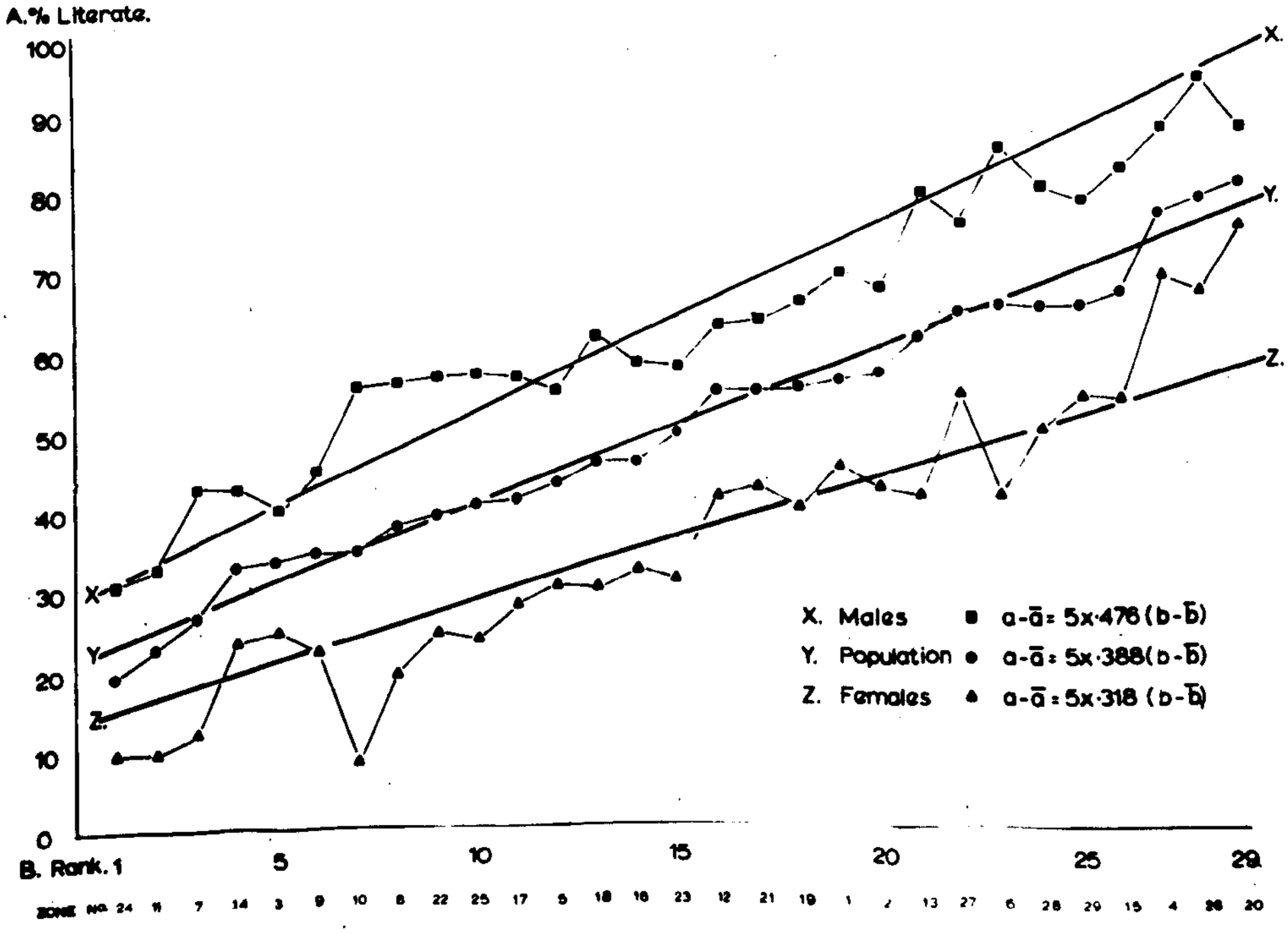
Fig. 20.

A. For the 29 zones

Percentage of Males Literate against Percentage of Females Literate.



B. For the 29 zones — Percentages of population literate, ranked in order of magnitude, Compared to percentages of females literate and percentages of males literate.



indicates the proportion of males who are literate against the proportion of females literate for the 29 zones. The correlation between the two is high, the product moment correlation coefficient being + .88 which is, by the 't' test, significant at the 99% level of probability.[4]

In the graph, (Fig.20A) a null line, Z, has been inserted (for convenience through the mean), indicating a constant increase on a one-for-one basis, to which the distribution is compared. Clearly this line, and any line parallel to it, will indicate that the difference between the sexes in terms of literacy, will always be constant, (in the case of Z, about 30%) despite different absolute levels of literacy in different parts of the city. A line steeper than this would indicate that the differences between the sexes increase as both sexes become generally more literate, and a line less steep would indicate the opposite.

The two regressions which it is possible to fit, would seem to provide an example of both these trends.[5] Thus, the regression of A on B (line X.) which enables us to predict the value of the percentage of males literate given the female fraction, is steeper than the null line Z, whilst that of B on A (Y), of females on males, is less steep - indicating a decreasing difference. Moreover, these two trends are almost symmetrically placed about the null line, at a distance fixed by the correlation coefficient (+.88).[6] From this conclusion must be that the gap between the sexes in terms of literacy probably remains

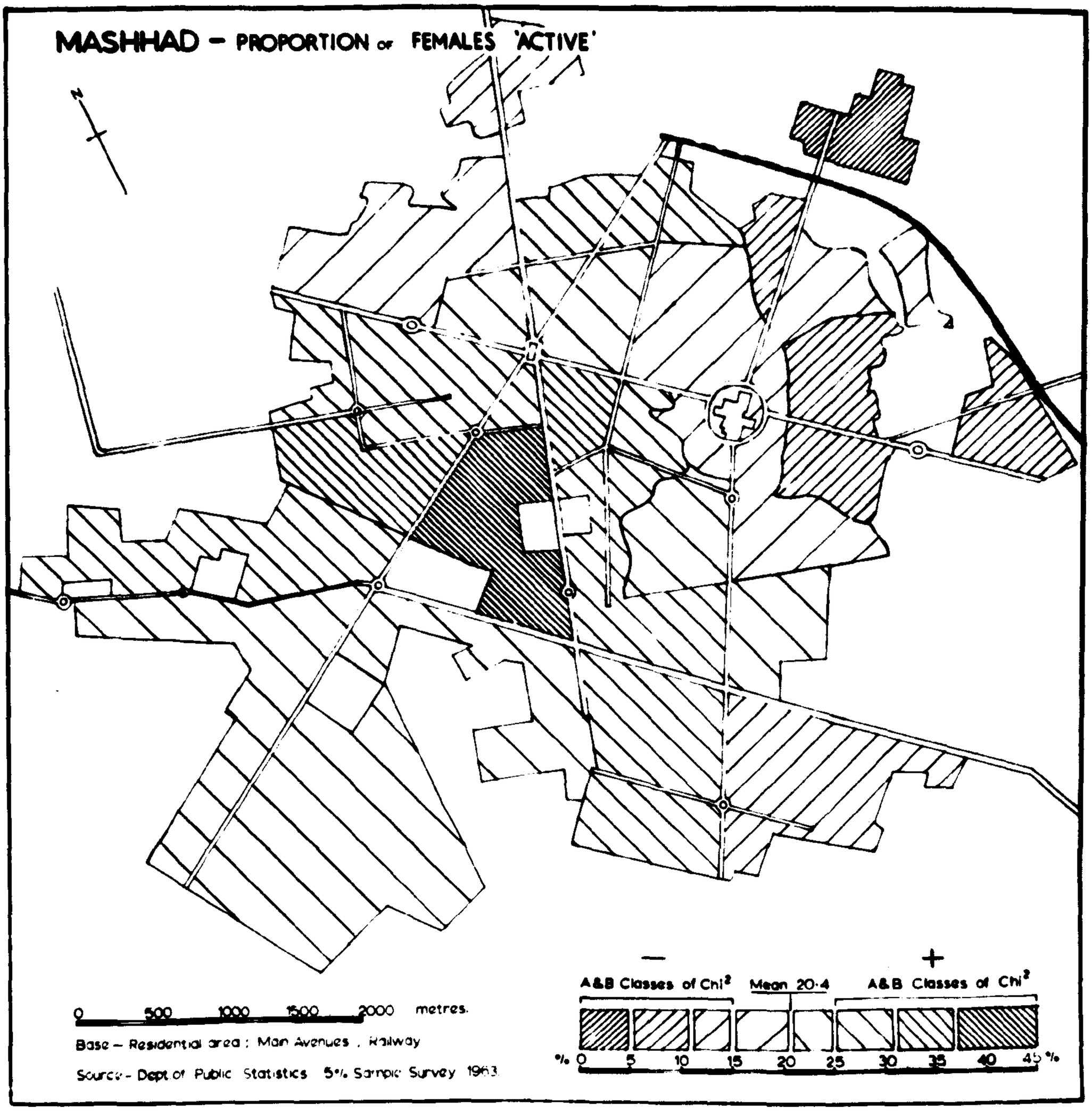
constant throughout the city despite large differences between the zones in the size of the literate proportion. Yet this is not the conclusion arrived at from the maps, where the larger area of negative values for female literacy, and the reciprocal small area of negative values on the male map indicates that there is a gap between the sexes which widens as the general rate of literacy increases. There is then an apparent contradiction here, which may be because the regression summaries of the graph are merely best estimates of the overall trend, which disregard possible fluctuations within the distribution. In order to resolve this problem, some other method was clearly necessary. Consequently Fig.20B was constructed, to compare the trend for male and female literacy with that of the population as a whole. The 29 zones were ranked in order of magnitude of the proportion of their population literate, and the values of male and female literacy were inserted. A regression was fitted to each of these curves, which were regarded as single variables against a constant unit of rank, along the B axis.[7] The constant 5 is merely a method of equating the scales of the A and B axes as they have been drawn. Here the trends are clear, with the regression for male literacy increasing more steeply than that of the total population, and the regression value (.476) for males is 122% of that of the total population (.388) whereas that for females (.318) is only 81.5%. These trends are well marked and significant and we can conclude that the difference between the sexes in terms of the proportion of the population literate increases from about 15% in the lowest literate areas, to about 40% on areas of high literacy. A partial explanation of

this may be in the fact that in the highest literacy areas of the west of the city, (which are also areas of higher income) many illiterate female domestic servants are employed, and live in the houses. These were counted in the survey, and probably depress the values for female literacy somewhat. At best however, this can explain only some of the difference observed, since the trends evident from the analysis of different areas of the city at one particular time are similar to those elucidated at the beginning of the chapter for the city as a whole, at two different dates - 1956 and 1963. In both cases the difference between the sexes in terms of literacy increases (though only slightly in the latter case). Thus it would appear that at least in one respect of emancipation, that is literacy, the female population is relatively less advanced, (when compared to the male population) in the higher socio-economic areas of the new town than it is in the old town, though not absolutely so. Evidence for this, both in the maps and the graph, is clear.

5. THE PROPORTION OF FEMALES 'ACTIVE'

Because of the somewhat unexpected trends discovered above, it was decided to take measurement of another variable which, like literacy, can be assumed to contribute towards the emancipation of women in Mashhad. This is the proportion of females 'active', defined as all those females attending school, or some other institution of learning, plus those who are working for a wage, employed by someone outside the immediate family and thus economically active.[8] The city mean for this measurement is 20.4%

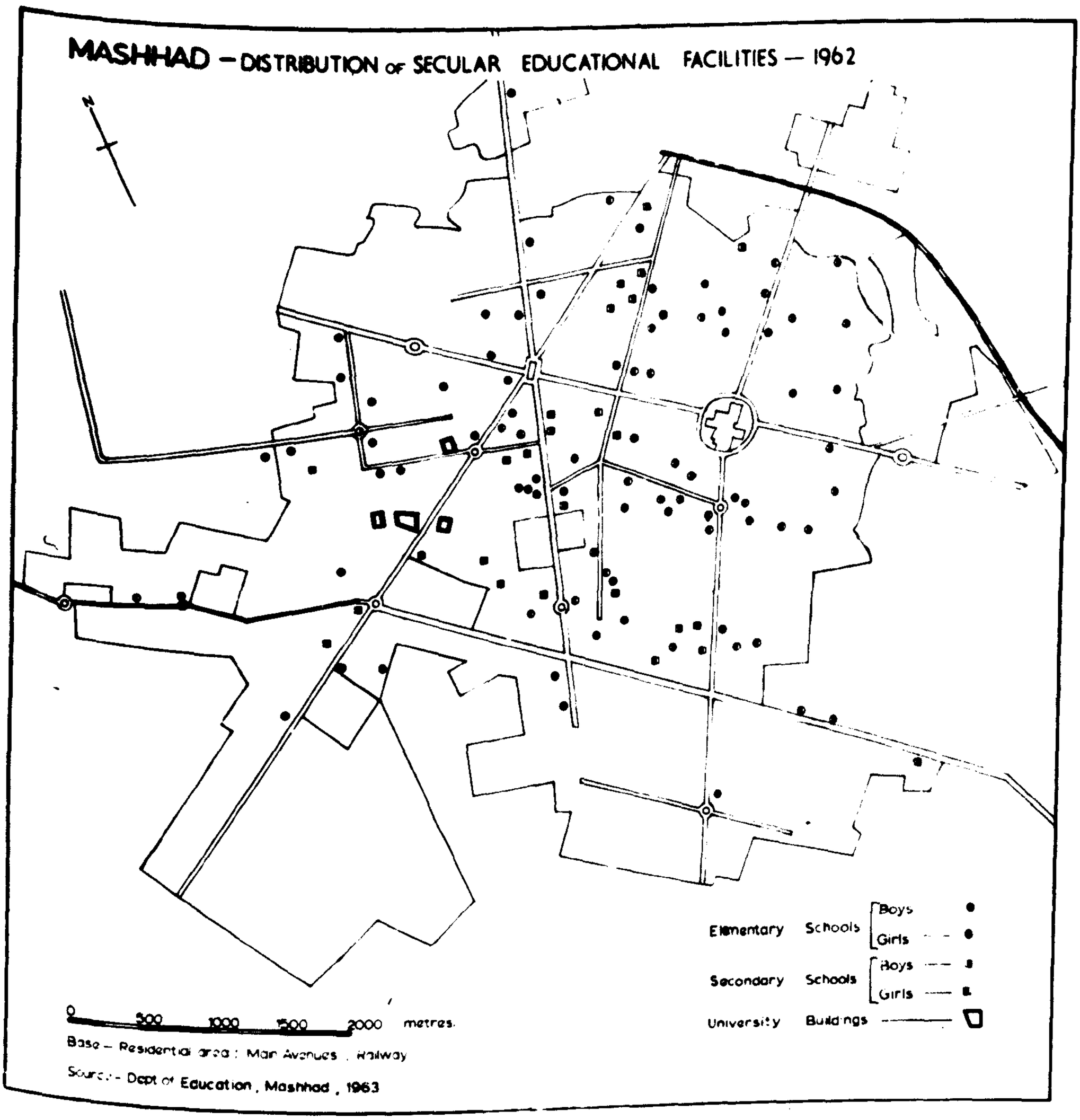
Fig. 21.


MASHHAD – PROPORTION OF FEMALES 'ACTIVE'
N
0 500 1000 1500 2000 metres.
Base – Residential area : Main Avenues , Railway
Source – Dept. of Public Statistics 5% Sample Survey 1963
–
+
A&B Classes of Chi²
Mean 20·4
A&B Classes of Chi²
% 0 5 10 15 20 25 30 35 40 45 %

'active' compared to about 90% for males. The map of the proportion of females 'active' (Fig.21) was constructed by the procedure outlined in the construction of the literacy maps. The city chi-squared value was in this case 218.15 for the 28 degrees of freedom available and is thus significant at the .001 level of probability. No map of the regional share of the component values of the chi-squared total was produced, but the results are included in Appendix A table 9. Those zones contributing most to the chi-squared total (type A above 3.20%; type B 1.10% - 3.20%) were, as in the literacy maps, used in the construction of the map of the proportion of females 'active', whilst zones contributing less than 1.10% of the total chi-squared value, were excluded.

The map (Fig.21) has not unexpected associations with that of female literacy, (Fig.19A), indicating low levels of 'activity' in the old town areas of the east, and much higher levels in the new town, to the west. The map does not however confirm the trend shown to exist in the consideration of literacy, that moving from zones of lower to zones of higher literacy, the rate of increase of the proportion of females literate is less than the rate for males or for the population as a whole. The negative deviations of the 'females active' map, reaching as low as 4.0%, are confined to the old town itself, and unlike the female literacy map, do not stretch into the new town or its suburbs - the positive negative transition is much further east on the former than on the latter.

Fig. 22 .


MASHHAD – DISTRIBUTION OF SECULAR EDUCATIONAL FACILITIES – 1962
N
0
500
1000
1500
2000 metres.
Elementary Schools
Boys
Girls
Secondary Schools
Boys
Girls
University Buildings
Base – Residential area : Main Avenues , Railway
Source :- Dept of Education , Mashhad , 1963

The maximum values on the female literacy map, which occur in zones 4, 20 and 26, the central areas of the new town, attain 65-75% but on the 'females active' map the absolute maximum (zone 4) is only 41.5%. It would seem in general that for a given zone, the level of female literacy is higher than the level of female activity in extra-family affairs, as can be seen by the average values (literate 33.6%, 'active' 20.4%). The old town zones have less than the mean proportion of females both literate and active, but in the new town the situation is different. All zones of the new town have a greater than average proportion of their females active, but relatively few (the central zones) have a greater than average literacy rate for females. Open-mindedness about the position of women in society is in the new town based more on toleration of independent economic and other activity, and less generally on the acquisition of literacy - but the few zones which do have a greater than average proportion of females literate tend to have very high rates.

6. THE DISTRIBUTION OF SCHOOLS AND OTHER EDUCATIONAL FACILITIES

Elementary education is compulsory and free of charge in Iran, though it is clear that a large minority of children do not go to school, and child labour is still common. The map of schools (Fig.22) indicates that the old town has few schools of any sort other than religious colleges, in which the mullah are trained, and a few religious 'prep' schools. Secular education, discouraged for a long time by the religious authorities, is still not fully developed on the old town. Moreover, if

the density of the old town population is borne in mind (Fig.11) Chap.6, it can be seen that the population is badly served by schools. The western zones of the city have the majority of the elementary schools, most of the secondary schools, and all of the institutions of higher learning (University, Professional School, Technical College, Nursing School) in the city, yet are much less densely populated than the zones of the old town. Some movement of students from the old to the new town areas is taking place, but this is limited in scope, and it is known for instance that none of the students of the university who live in Mashhad city dwell east of Kh. Tabarsi and Kh. Tehran - few in fact are from the old town. Thus the distribution of educational facilities tends to lend support to the contrasts evident between the old town and the new town.

7. SUMMARY AND CONCLUSION

National and regional comparisons of literacy rates show that even by the standards of the developing world, Iran has low rates. Within Iran there exist great differences in literacy between urban and rural areas, and between males and females. In Mashhad the proportion of the population literate has increased in recent years, at a rate slightly higher for males than for females.

The spatial distribution of literacy in Mashhad shows a marked new town - old town polarity with higher than proportionate rates of literacy in the new town, and (reciprocally) lower than proportionate rates in the old town and its eastern suburbs. Association between the maps of literacy

for the male, female and total population is close, the chief difference being in the position of the boundary between the zones with literacy rates higher than average, (new town) and those with rates lower than average (old town). From this it is evident that even in the new town there exist zones with rates of female literacy below the average for the city.

The Linear distribution of literacy amplifies the picture, since it shows that the difference between the sexes in terms of literacy increases as the general rate increases, so that in zones of the old town the difference is only 15-20%, whereas in the new town it attains 40%. This indicates that this particular aspect of the emancipation of women is not very advanced, even in the new town of Mashhad.

The proportion of females 'active' another aspect of emancipation, has a trend partly opposed to the latter. In general the new town - old town distinction remains, but whilst, the literacy rate for females is generally higher than the 'activity' rate, the latter is common in greater than average proportions to many more zones of the city than the former. It appears that a minority of females is active outside the family circle in all zones of the city (though this is small in the old town), but that this minority does not grow much in size in those zones of the new town where the female literacy rate is high.

The distribution of schools in the city tends to reflect the

distribution of literacy and 'emancipation', with very few secular schools in the densely populated zones of the old town, and many in the new town.

Notes to text, and references

1. Census of Iran 1956. This is also the U.N.definition, and obviously varies with language, from country to country.

2. See Appendix B,1.

3. Chi-squared test. Appendix B,6.

4. Product Moment Correlation Coefficient, and 't' test. Appendix B,3.

5. Regressions. Appendix B, 4(2)

6. Product Moment Correlation Coefficient. Appendix B,3

7. Regressions. Appendix B, 4(2)

8. The data used were derived from the 1963 5% Sample Survey of Households.

9. STRUCTURE OF OCCUPATIONS

1. Comparisons
2. Mashhad
3. Economic Dependency, some comparisons
4. Economic dependency ratio in Mashhad
5. Worker status in Mashhad
6. The occupations structure of the city
7. Summary

The occupations structure of urban areas in the underdeveloped world has often been used as an index by which to measure relative degrees of urbanisation, and, recently 'over-urbanisation'.[1] With some qualification, such an index can be of value generally in the description, analysis, and comparison of cities, and of zones within cities.

1. COMPARISONS

Table 19 is a breakdown of occupations in urban and rural areas for selected places and regions in Iran. The Urban - Rural differences are obvious, with agricultural and other primary occupatuons employing at least 70% of the working population in rural areas. Within the cities in the table, there is also however a relatively large sector of primary activity, and this is particularly the case amongst the smaller cities, suggesting that at this level (say up to 50,000 persons) towns still have a significant proportion of their population in primary activities, and to this extent are only marginally 'urban'. This is partially due to the fact that the definition of 'urban' in the Iranian census is in terms only of population - any place of over 5000 persons being considered urban.

The cities considered in Table 19 all have at least one-third of their occupied force in secondary activities - the lowest (35%) being in the capital Tehran. For under-developed economies, this proportion is low, since it includes construction workers within it. A similar figure is

Table 19

Major Occupations by employed population ten years old and over, selected areas, Iran 1956, in Percent

		Iran		Rural Iran		Urban[a] Iran		Tehran		Rural Khorasan		Urban Khorasan		Mashhad		Isfahan		Shiraz		Tabriz	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
(1) Farming, forestry hunting, fishing	Primary	56.4	55.5	75.1	74.3	18.4	17.4	3.1	1.6	72.3	71.4	11.9	10.9	7.0	6.0	7.8	6.9	7.1	6.0	4.6	3.8
(2) Mines, quarries, wells, qanats	Primary		0.9		0.8		1.0		1.5		0.9		1.0		1.0		0.9		1.1		0.8
(3) Crafts, production processes	Secondary	19.3	19.3	12.3	12.3	36.1	36.1	33.0	33.0	16.4	16.4	38.7	38.7	38.5	38.5	44.0	44.0	32.7	32.7	48.6	48.6
(4) Sales, and related occupations	Secondary		5.8		2.2		13.8		15.0		2.2		12.7		15.3		13.2		15.0		14.3
(5) Transport occupations	Tertiary	20.6	2.4	10.4	1.3	39.6	4.4	55.6	5.9	8.4	0.8	45.3	3.0	45.4	5.1	40.3	4.7	47.0	5.6	46.9	3.8
(6) Managerial, clerical administrative	Tertiary		3.1		1.2		5.9		11.4		0.6		8.8		6.4		5.5		6.6		5.8
(7) Professional, technical etc.	Tertiary		1.6		0.7		3.4		4.6		0.7		4.1		4.0		4.0		4.9		3.2
(8) Services	Tertiary		7.7		5.0		12.1		18.7		4.1		16.7		14.6		12.9		14.9		13.1
(9) Armed forces, and others			3.6		2.4		5.8		8.3		2.9		4.1		9.2		7.8		13.0		6.7

a. excluding Tehran
b. excluding Mashhad

1. Classes - primary, secondary, tertiary
2. Detailed breakdown

Source - Census of Iran, 1956

found for example in Kingston (Jamaica)[2] where 36% fall into such a category (only 24% are in actual production processes). This 'weakness' in the employment structure has often been noted (in Urban India only 24% are in all secondary occupations)[3] and is a product of several factors, such as the lack of capital in the economy, with its attendant low levels of mechanisation and specialisation. This means that many goods are imported, not manufactured. Ancillary to this are therefore the large proportions of the employed population in tertiary activities of various sorts - commercial (dealing partially with the large quantities of imports) and non-commercial.

Indeed, within Iran tertiary employment makes up a great proportion of the structure, Tehran having 55.6% of its working population so employed, and the provincial capitals between 40% and 47%. Even for 'urban Iran' generally (excluding Tehran) the figure is 39.6%. Normally such large proportions are, in the west, to be regarded as indications of an advanced economic and social structure, but in countries such as Iran they are a manifestation of the existence of a large sector of underemployment, or at least of employment in jobs which by their nature are of low productivity as Sjoberg[4] and many others have indicated.

2. MASHHAD

This situation is evident in Mashhad, and indeed in all the larger cities of Iran, where myriads of 'officials' are maintained by government offices, served by an equally vast army of 'tea-boys', most of whom in the

economic sense are totally unnecessary. Within the higher, more powerful parts of society, jobs and 'vacancies' are created for relations and friends or perhaps creditors. These are sinecures of which the wealthy might hold two or three at one time, being paid a salary for each. Lower down in society an equally large reservoir of underemployment exists in the petty retail trading with which a large part of the employed population is concerned. There are many street traders, with minute amounts of capital and of goods to sell. Indeed, since economic and business units are so small, opportunities for employment are scarce and private initiative is of great importance. Thus the number of 'self-employed' is high, especially in retailing, which is another very much 'over-staffed' sector of the economic structure - a vast proliferation of sales personnel, competing to sell beads, shoe laces, oranges, vegetables, in the commercial streets and residential quarters of the town. This situation has existed for a long time (see O'Donovan 4 in Chapter 4). Such types of activity are the essence of low productivity, with many men 'sharing' a job (and its salary) which could be carried out more efficiently by one man. It is one of the vicious circles which lead to low standards of living and poor wages.

Yet within the tertiary sector, perhaps the lowest producitivty and highest underemployment is amongst the group registered under 'personal service'. Iran generally is a country of the ubiquitous domestic servant, and even quite modestly well-off families can afford to employ a servant or (more commonly) a servant family, which lives in the house or in a small hut in the garden. Many of these servants families are trusted family 'retainers'

whose offspring continue to live off the household despite the fact that their numbers are far in excess of the work available. Where relationships are inter-personal, it becomes socially almost impossible to declare a person 'redundant'.

The distinctions between unemployment and underemployment in a country such as Iran are not easy to make, and indeed since statistics are deficient in both quality and quantity, generalisations about these topics in such areas must be treated with care. It would seem that the recording of 'unemployment' is possible only when society and the economy have developed to a point where the distinction between periods of work and periods of leisure is both practical and well recognised. However, in the rural areas of Iran where subsistence agriculture is still common, this distinction is blurred. Consequently the contention generally held in recent literature that an urbanward migrant generally tends to move from rural underemployment to urban unemployment does not fully apply in Iran. Clearly if the state of un-employment is notidentifiable in the rural areas of Iran, then the absence of it in public statistics is not significant. In the urban areas however where some specialisation and mechanisation do exist, as in the developed world, then people can identify themselves as unemployed and do therefore appear in statistics. Thus in this sense employment and unemployment are not so much occupational states as concepts which go along with advancement in the economy. Whilst it is valid to speak of unemployment in an urban area of Iran, it may not be valid to do so in a rural areas.

Plate 13. Hand production - the manufacture of Mosaic.

Plate 14. Bazar Sarshur,a bazar in decline.

On the other hand, it is certain that underemployment is common in rural areas, including the area around Mashhad, where in 1963 an enlightened farmer[6] was able to show that in one of the villages he rented, each man was on average (in a short period in the spring) actually working fully only about 85 minutes per day, though it took him between eight and eleven hours to do this. However, in Iran, as in other areas, there is little reason to suppose that underemployment is significantly less of a problem in the large urban centres, and illustrations are common:-

> 'Thus the recent rapid rate of urbanisation in Asian countries does not bespeak a corresponding growth of industry but a shift of people from low productive agricultural employment to yet another section marked by low productivity employment, namely handicraft production, retail trading, (and) domestic service in urban areas'[7] (Plate 13)

It is clear however that whilst unemployment is a problem in similar cities to Mashhad (Kingston for example with 18.4% of its potential labour force unemployed), in Mashhad itself unemployment may not be so general. If by unemployment, we mean those people wishing to work but not having a job, then Table 20 is relevant, which indicates very low percentages of unemployed, whether measured against total population, or against potential labour force - at a maximum, about 5% (Table 20).

Table 20

UNEMPLOYMENT IN SELECTED CITIES, IRAN, 1956

Place	1.	2.
Mashhad	1.07	2.38
Isfahan	1.15	2.62
Tabriz	2.04	4.56
Shiraz	2.21	5.10
Tehran	2.01	4.33

1 = % of population over 10 years old.

2 = % of 'active' population over 10 years old. (i.e. employed or at school).

Source - Census of Iran, 1956

These low figures are due possibly to the fact that the strong social and moral obligations to help members of the family partially conceal the existence of unemployment, and partially channel it into further underemployment. A man 'helping' his brother to sell oranges would not be registered as unemployed, no matter how little he earned. Moreover, work in itself tends to be so atomised that it is possible to absorb large and unnecessary number into the employment structure. This is most clear amongst porters, who are so many in number in Mashhad that few can get more than one or two commissions in a whole day's work - all, however, are 'employed'.

Because of all these drawbacks, the terms 'employed' and 'unemployed' have limited use, and are not satisfactory. They must stand only in the absence of any statistical data on the more universal state of 'under employment'.

3. ECONOMIC DEPENDENCY, SOME COMPARISONS

Ratios of economic dependency have sometimes been used to describe and analyse the occupations structure of underdeveloped communities. Here, (Table 21), the ratio is between those members of the population economically active and all other members of the population, yielding the mean number of persons supported by each 'active' person in addition to him/herself. It is a complex function of other variables, some of which have already been considered, others yet to be so. The main ones may be listed as :-

(i) The age structure of the community, particularly the ratio between adults and others.

(ii) The sex-structure, in particular the ratio between the number of adult males and females, whose potentialities for employment in society are completely different.

(iii) The level of education in the community - or more precisely, the numbers of students and their age.

(iv) The relative emancipation of women in the group, measured by the proportion of them who are 'active' whether at school or work.

There are no doubt other factors which contribute to the ratio, which cannot be so easily identified or measured. Table 21 indicates the percentage active and the economic dependency ratio for selected areas in Iran and Pakistan. The figures do not however include as 'dependents' those village dwellers receiving increments to their income

from members of the family working in urban areas. It was established in Chap.7 that the simple dependency ratio is much greater in the rural areas of Iran, than in the urban areas since there are fewer children and elderly people in the towns (factor (i) above). This ratio was in indirect proportion to the size of the town. The economic dependency ratio, however, does not seem to work in this way. Table 21 indicates that the economic dependency ratio is greater in urban than in rural areas, but declines again in the large cities, this being the case in the comparison of Tehran with urban Iran and of Mashhad with other urban areas of Khorasan. Whilst the dependency ratio is lower in small towns than in rural areas, a product partially of differential general fertility, and is indicative (as seen in Chap.7) of more adults and fewer children and old people, many of these adults are not fully employed in economic activities, and so the economic dependency ratio tends to be higher in the small towns than in the villages. The number in schools, and the fact that a smaller proportion of women are able to work in small towns (because opportunities for productive work within the house are limited and work outside the home is not socially acceptable) are both factors which probably contribute to this situation. The reversal in the trend of the economic dependency ratio for larger cities (a decline) could be due to the larger numbers of predominantly male in-migrants, whose dependents in the villages are not included in the statistics, as well as to the fact that employment opportunities for women are more numerous both in the home (hand production) and outside it, where employment of women is more socially acceptable.

Table 21

ECONOMIC ACTIVITY STATUS, and ECONOMIC DEPENDENCY RATIO, in SELECTED AREAS, IRAN 1956, PAKISTAN 1951.

Area.	A. Population over 10 years old — % Economically Active			B. Total Population — % Economically Active			Economic Dependency Ratio
	Total	Male	Female	Total	Male	Female	
Iran	47.5	83.9	9.2	31.2	-	-	2.124
Rural Iran	48.5	86.6	9.2	32.1	-	-	2.115
Urban Iran	44.8	78.5	9.3	31.2	-	-	2.218
Tehran	46.4	78.4	9.4	33.9	-	-	1.948
Khorasan	46.9	83.1	9.2	32.6	-	-	2.070
Rural Khorasan	47.6	84.3	9.0	32.7	-	-	2.059
Urban Khorasan	44.4	78.0	11.5	31.6	-	-	2.169
Mashhad	45.0	80.0	8.3	32.6	-	-	2.065
Tabriz	44.8	79.3	8.6	32.1	-	-	2.112
Shiraz	43.3	76.1	7.0	30.4	-	-	2.293
Isfahan	44.0	78.3	7.8	31.0	-	-	2.225
W.Pakistan Urban	-	-	-	33.4	-	-	-
W.Pakistan Rural	-	-	-	31.2	-	-	-
Karachi	-	-	-	45.2	59.7	2.3	1.433
Peshawar	-	-	-	38.1	64.1	0.8	1.625

Sources - Iran, Census 1956
West Pakistan, Census 1951

The above possibilities would seem to be similar in essence to conclusions about Asian and Far Eastern cities, drawn up by the E.C.A.F.E. section of U.N.E.S.C.O.,[7] and to those arrived at by Santos,[8] in his consideration of Eastern Latin American, and West African cities, in which there is the same discrepancy between the two ratios of dependency, and economic dependency. The figures for Pakistan indicate a similar proportion of the population 'active', and also a similar economic dependency ratio. But for both Peshawar and Karachi (and more particularly the latter) the proportion 'active' is much greater than in Tehran, for example. This perhaps indicates a different type of urban development, with greater employment opportunities for males, despite the fact that both Iran and Pakistan are almost wholly Muslim states, in which few women are employed.

4. THE ECONOMIC DEPENDENCY RATIO IN MASHHAD

The 1963 5% Sample Survey of Households was used to calculate the ratio for the 29 urban areas of the city. The city mean of 2.878 is much higher than the Census figure of 1956 (2.065), and higher than any other ratio in the Table (21). This is because only households were considered, and the recent (chiefly male) in-migrants not living in households, whose dependents (if any) are in the villages around Mashhad, are largely excluded here.

However, the chi-squared test indicated that in none of the 29 areas is the ratio deviant enough from the null hypothesis of proportional distribution (of active and dependent persons), for us to consider the variations as any other

Table 22

OCCUPATION BY WORKER STATUS FOR THE EMPLOYED POPULATION 10 YEARS OLD AND OVER in %, MASHHAD, 1956

Occupation	Employer	Self employed	Government Employee	Unpaid family worker	Private employee	Other	Total Persons
(1) Farming, forestry hunting, fishing	7.8	44.8	2.1	2.3	43.0	-	4,643
(2) Mines, wells, quarries, qanats	4.6	14.0	1.3	1.6	78.4	-	754
(3) Crafts, production processes, etc.	2.5	16.9	1.1	1.6	78.0	-	29,651
(4) Sales and related occupations	2.7	65.5	0.3	3.7	27.7	-	11,832
(5) Transport Occupations	0.5	23.1	8.2	0.3	67.9	-	3,955
(6) Managerial, clerical administrative	1.6	5.3	76.5	0.1	16.5	-	4,965
(7) Professional, technical	0.7	32.0	48.8	0.1	18.3	-	2,927
(8) Services, domestic and other	0.9	9.9	13.9	0.6	74.7	-	11,231
(9) Armed forces and all others	-	0.3	31.0	-	3.0	65.7	7,127
TOTAL	2.2	23.6	12.7	1.4	54.0	6.1	77,085

Source - Census of Iran, 1956

than could arise from sampling error or chance. This is not unexpected, since the ratio in itself a complex one, as indicated, influenced by many variables, often working against one another. Moreover, the small variations which were recorded, some marginally significant, do not seem to bear any relation to the dependency ratio discussed in Chap.7. Clearly variations of this type of factor within the city will need further and more detailed work for their elucidation.

5. WORKER STATUS IN MASHHAD

Table 22 indicates the worker status of the employed population in various occupation (not industry) groups. The high number of self-employed in the sales and allied trades group (65.5%) has already been noted as evidence of underemployment. Hoselitz makes a similar point -

> In India'... with the growth of industry, the number of industrial and handicraft workers who work on their own account has also increased, and in many Asian cities, the numbers of salaried and wage workers in service trades and manufacturing does not exceed the number of self-employed persons'[9]

In secondary occupations there are some larger units (such as cotton ginns, and a fruit-canning factory) so that the number of self-employed is less.

Evidence of another main reservoir of underemployment is clear in Table 22, where 76.5% of the 'managerial, clerical and administrative' category are in government employ. Indeed, outside government activity

commercially viable economic and business units are so small in general, that the managerial and clerical types of tertiary occupation are hardly represented. As might be expected in an economy only as yet partially developed and capitalised, functional specialisation, the by-product of high economic and social efficiency is rare. It proliferates in government employment as evidence of underemployment and a sort of indirect social benefit service for a privileged part of the community.

The large proportion of 'service' employees in the 'private employee' section (74.7%) is evidence of the third reservoir of low-productivity activity, previously identified, manifested in the large number of domestic servants. This situation is possibly only where, as in Mashhad, incomes distribution is highly polarised between the rich few and the proliferating poor.

The fact that unpaid family workers are very few in number, forming only a small proportion (1.42%) of the total employed, is of some interest. Sjoberg[10] (and others) noted that this type of employmeht is common in the pre-industrial city, and in the cities of the underdeveloped world. Yet in Mashhad, a Muslim city in which family ties and organisation are still strong, little unpaid family labour is recorded. This is partially because the practice of child labour, still common in Mashhad, particularly in the carpet workshops, is illegal and so passes unrecorded. Yet despite this, the low proportion suggests that the influence of the family is now less than it was at all levels in society, and many children growing up are in school, or absorbed into activities outside the family circle.

Table 23

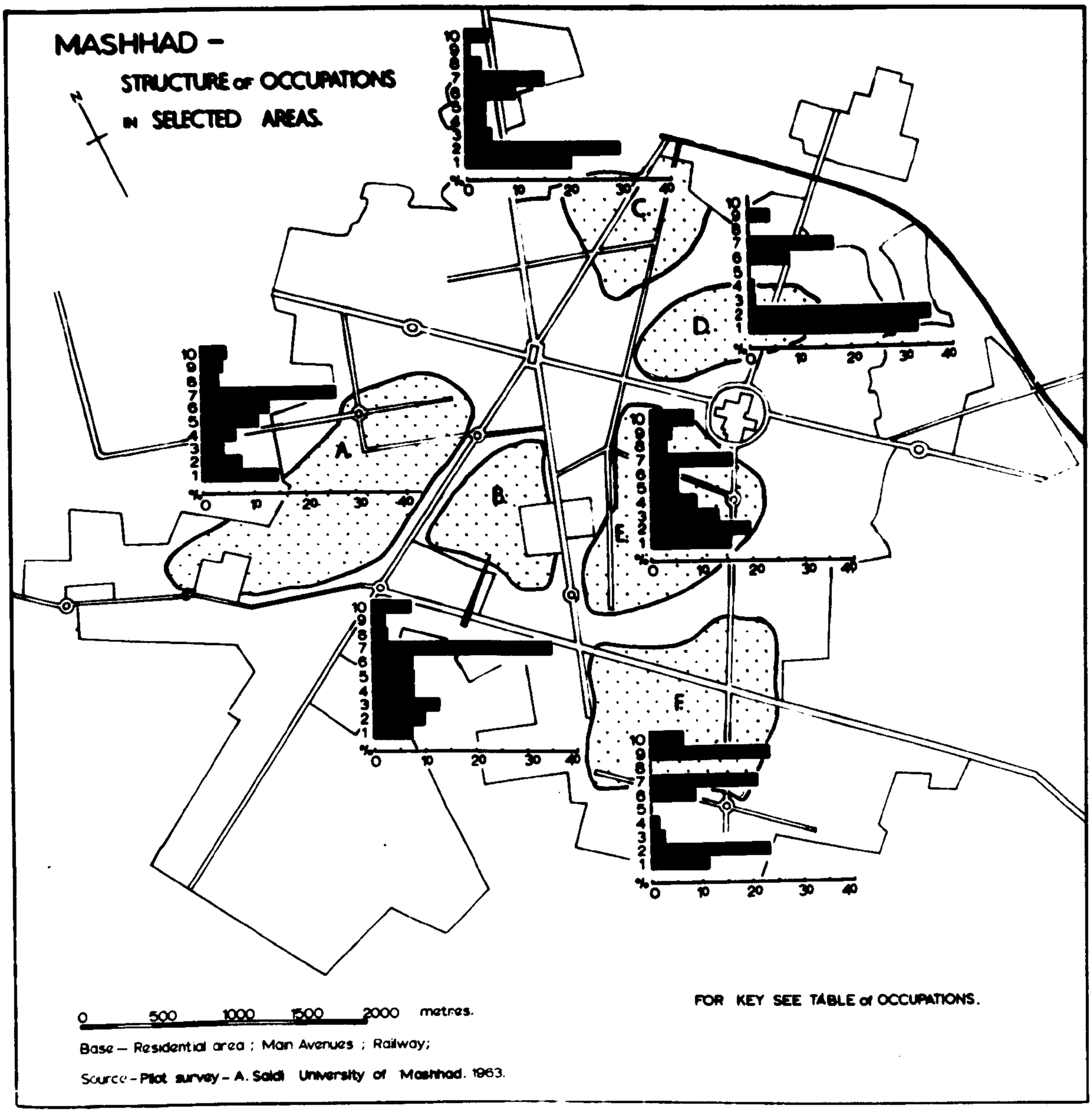
OCCUPATIONS STRUCTURE OF 'ACTIVE' POPULATION OVER 15 YEARS OLD, IN SELECTED AREAS, MASHHAD 1963 - percentages

AREAS. and No. of persons interviewed	A 181	B 130	C 97	D 92	E 177	F 108
(1) Labourers and domestics	14.9	7.7	20.6	33.7	15.3	11.1
(2) Small businessmen operators, and artisans	9.9	10.0	31.0	35.9	19.2	24.1
(3) Merchants	3.9	13.1	5.2	1.1	13.0	2.8
(4) Landowners	6.6	7.7	4.1	1.1	8.5	1.9
(5) Professionals	11.0	7.7	4.1	-	5.6	-
(6) Teachers, religious officials etc.	13.3	6.9	10.3	7.6	5.6	8.3
(7) Government employees	27.1	35.4	15.4	16.3	16.5	21.3
(8) other tertiary workers	3.9	3.1	3.1	-	3.3	-
(9) Army personell	4.4	2.3	1.0	4.3	4.5	24.1
(10) All other, students, and unemployed	5.0	6.1	5.2	-	8.5	6.4
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Source - Pilot Survey of Mashhad, 1963.

N.B. Housewives were regarded as 'non-active' and excluded from the survey.

Fig. 23.


MASHHAD –
STRUCTURE of OCCUPATIONS
IN SELECTED AREAS.
N
A
B
C
D
E
F
0 10 20 30 40
0 500 1000 1500 2000 metres.
Base – Residential area ; Main Avenues ; Railway;
Source – Pilot survey – A. Saidi University of Mashhad. 1963.
FOR KEY SEE TABLE of OCCUPATIONS.

The large proportion of recent in-migrant families in Mashhad may also be a factor here.

6. THE OCCUPATION STRUCTURE OF THE CITY

Data on actual occupations were not available from the 1963 5% Sample Survey. However, an earlier pilot study of several areas within the city yields results which are of value for comparative purposes but do not represent the employment structure of the city as a whole. (Table 23) Strict control was not possible in the study, and the sample is not a random one, consequently no attempt will be made to draw statistical inferences.

The areas involved (Fig.23) were sample in the manner described in Appendix C,2. Blocks of twenty households were questioned as to occupation, and as far as possible all those economically active at the time, male and female, were recorded. These blocks were then grouped together as being roughly representative of the areas sampled, and the data converted into percentages for comparative purposes. The main bias is in the direction of emphasising the 'up-scale' occupations of professions, merchants, landowners, and teachers, at the expense of the lower two classes - labourers and small businessmen. Some labourers are included in other categories, where such activities involve the employment of labour.

The westernmost area (A) of the map (Fig.23) has a low proportion of labourers and very high proportions of professionals, teachers, and government employees, in the tertiary activities. Its structure is

suggestive of the higher literacy and education observed in this area (A) (parts of zones 15, 20 and 1), and probably of higher income. Area B, in the centre of the new town, is similar to A but here there are fewer labourers, whilst commerce claims many more in both merchant and small business classes. Correspondingly there are fewer professionals and teachers. The large proportion in government employment is however increased to over one third (35.4%) of the total. Area B is again a high status area in terms of occupation, though not so high as A, and based less on higher education and literacy, more on the higher grades of commercial activity.

Area C, in the north, is in great contrast to A and B. Here, there are many more labourers and domestics (20.6%) and whilst the proportion of merchants is lower, that of the smaller businessmen is 31%. There are few landowners, professionals and teachers here, whilst the proportion in government service is reduced to 15.5%. This area (c) thus fits lower on the scale than the previous two, with its status based on the lower grades of commerce - the small retailer or producer, in established or non-established premises. The much lower levels of literacy and education observed also fit this picture. Area D has similarities to C. Here, small business occupations are 35.9% of the total, maintaining the strong commercial base of small entrepreneurs, mainly self-employed. Reciprocally there are fewer in the tertiary classes of activity, including government service. Merchants and

landowners are few in number, whilst one third of those questioned indicated their occupation to be in the labouring - domestic category.

Area E, south of the Harram, is along the old Bazar Sarshur (as seen in Chap.6), now changing its function from a commercial area to a higher class residential area. Here, both landowners and merchants are well represented, and there are still many smaller businessmen. The area must be placed high on the social-occupational scale by virtue of this high grade commercial interest, though the lower levels of education are reflected in the smaller proportion in professional and other tertiary activities, including government employment. Here much of the power of the bazar is concentrated, with many of the merchants of the city living in the larger houses of the area (Zone 21).

Finally Area F in the south of the town is notable for its large proportion of army personnel, making up 24.1% of the total. Other occupations are thus under-represented, with the proportion of labourers low (possibly too low) and few tertiary workers outside government employment. The proportion of small businessmen and artisans is still high however - for there are many small workshops set up in the newly-built houses of area F (zones 2 and 18), so that the commercial base remains.

Thus the five areas provide some instructive comparisons in terms of their occupational structure, which mirror the situation in education and literacy so far outlined. Moreover, they can be tentatively grouped in terms of a social-occupational scale, based on their dependency on the various occupational classes. Area, A with its foundations on landed

money and education could rank highest, whilst B, partially commercially oriented, and E, totally so, but in the higher grades, could appear second and third on such a scale. Area C, with its large proportion of small entrepreneurs, must come fourth, and D, of similar structure, but with less moneyed groups, must be placed, along with F, at the bottom of the scale. Possibly if areas further east or in the old town suburbs had been sampled, they too would appear low on the scale - perhaps lower than F.

7. SUMMARY

There has been presented a simplified picture of the occupational structure of the city, both in internal detail, and in comparison with cities with similar types of social and economic development. Mashhad would appear to have many of the 'characteristics' of an underdeveloped urban occupational structure, such as the large tertiary sector, the high proportion of self-employed and much underemployment, and possibly unemployment. Its relationship to the rural area around it seems to be similar to other cities in circumstance of this type. Lastly, the differences in structure between various areas within the city are shown to be related to variables so far discussed, and themselves are a descriptive tool with which to characterise and possibly rank the areas concerned.

Notes to text, and references

1. Sovani, N.V. "The analysis of 'over-urbanisation" Ec.Dev. and Cult. Change. Jan.1964 Vol.XII No.2.

2. Clarke, C. "Population pressure in Kingston, Jamaica A study of unemployment and overcrowding" I.B.G. Annual Conf.Bristol 1965 Mimeo.

3. Hoselitz, B.F. "Urbanisation and economic growth in Asia" Ec.Dev. and Cult.change.Oct.1957, Vol.VI.p.27

4. Sjoberg, G. "The pre-industrial city" Chap.7.1960. Free Press, Glencoe, Illinois, U.S.A.

5. O'Donovan, E. 'The Merv Oasis' London 1882, Chap.XXX.

6. Mr.J.Turbati - of Mashhad. Private communication to the author, 1963

7. U.N/U.N.E.S.C.O. Seminar, proceedings of, Hauser, P (ed.) 'Urbanisation in Asia and the Far East' Bangkok, Aug.1956. (Published Calcutta, 1957, by UNESCO Research Centre on the Social Implications of Industrialisation in Southern Asia, 1957) p.133. quoted also in Sovani, op.cit.p.118.

8. Santos, M. 'Quelques problemes des grandes villes dans les pays sous-developpees' Revue de geog.de Lyon: XXXVI 1961 No.3.p.202.

9. Hoselitz, op.cit. loc. cit.

10.Sjoberg, op.cit. loc. cit.

10. HOUSEHOLD SIZE

1. Introduction
2. Comparisons
3. Co-relations of household size
4. Distribution of household size - Mashhad
5. Summary and Conclusion

1. INTRODUCTION

The distribution of household size, and its co-variables are important factors in understanding the present development of Mashhad. The size of the domestic grouping, formerly influenced by the existence of the extended family, is becoming smaller, and this has important implications for the population of the city. The term ' household ' is used here in preference to 'family' since, it is more easily definable than the latter. 'Household' will be regarded as that group of persons, regardless of age or relationship, who live together, sharing cooking facilities, and some, or part, of individual incomes. This unit normally therefore consists of the familial group - husband, wife and their unmarried children. But it is often the case in Iran, as in other countries of the Muslim world, that because of the predominance of the extended family, the household is much bigger than the familial group. Husband and wife commonly share a household with their married children and grandchildren, as well as other related adults, married or unmarried.

2. COMPARISONS

There are generally available four measures of domestic grouping — persons per household, households per dwelling unit, persons per dwelling (a product of the first two), and persons per room, which are considered as far as is possible for some countries of the Middle East in table 24. The varying definitions and census inaccuracies mean that the figures are unreliable: however, their gross comparability is probably not affected.

Table 24 HOUSING - MUSLIM COUNTRIES

Area	Persons per household	Households per dwelling unit	Persons per dwelling unit	Persons per room
Sudan[1]	5.0	-		
Three towns (Khartoum)[2]	5.9	1.4	8.1	2.3
Iraq[3]	5.64	1.07	6.03	
Urban Iraq[3]	-	-	-	2.05
Kerbala[3]	5.66	1.22	6.91	
Iran[4]	4.62	(1.00)	(4.62)	-
Urban Iran[4]	4.62	-	-	2.07[5]
Mashhad[4]	4.71	1.57	6.84	-
Jordan (main towns)[6]	-	-	9.04	-
Amman[6]	-	-	8.2	-
Bethlehem[6]	-	-	10.3	-
Jerusalem[6]	-	-	19.4	-

1 in Abdelmeguid Farrag 'Demographic trends in the Arab World' in Morroe Berger (ed.) 'The New Metropolis in the Arab World' p.17. New Delhi 1961

2 in Sala Marzari 'Greater Khartoum' in Morroe Berger. op.cit. p.125

3 in Doxiadis Ass. 'The Future of Kerbala', Athens 1958

4 Census of Iran 1956

5 Bank Markazi, Iran, Sample Survey of Consumer Expenditure and Income 1959-60. Tehran (various)

6 in Abdelmeguid Farrag. op.cit. p.14

The number of persons per household is still high in the Middle East, - averages such as Iraq 5.6 and Iran 4.6 indicate this. It is also the case that many dwelling units are occupied by more than one household, a product of two types of domestic grouping. The traditional house (particularly in urban areas) is a dwelling in which are to be found separate households, forming an extended family group, and their servant families, if any. Sometimes the whole extended family may live in one household. Increasingly however, the larger houses in the centres of cities such as Mashhad are being converted into multi-storied dwelling units in which smaller households, some of them split up due to in-migration, are living. This is a trend well known in the west, where, for example, large Victorian terraced houses are converted into apartments as their owners move out to the suburbs. Mashhad in 1956 had an average of 1.57 households per dwelling unit, and Kerbala in Iraq (a centre of Shia' pilgrimage similar to Mashhad) 1.22. Because of this situation, the numbers of persons per dwelling unit can become extremely high. Mashhad's figure was 6.84 in 1956, and Kerbala's 6.91 in 1957; but figures for Middle Eastern cities can attain 8.2 (Amman) 10.3 (Bethlehem) and even 19.4 (Jerusalem) persons per dwelling unit.

The number of persons per room is a statistic which is rare in the Middle East but it is probable that at least in the urban areas, there are more than two persons per room, and the figures for Urban Iraq (2.05) and Urban Iran (2.07) are illustrative. These densities are double those of Western Europe, where figures such as 0.8 persons per room for Urban United Kingdom, and 0.7 for Urban Belgium are normal.[1]

Table 25

HOUSEHOLD SIZE, SELECTED AREAS, IRAN 1956

AREA	MEAN	MEDIAN
IRAN	4.62	4.4
Rural Iran[1]	4.49	4.4
Urban Iran	4.61	4.3
Tehran	4.29	4.1
KHORASAN	4.16	3.9
Rural Khorasan[2]	4.15	3.9
Urban Khorasan	4.23	3.9
Mashhad	4.21	3.9
Tabriz	4.93	4.8
Shiraz	4.50	4.3
Isfahan	4.66	4.3

Source - Census of Iran 1956

1 Excluding Tehran
2 Excluding Mashhad

Within Iran, the distribution of household size between urban and rural areas is complex. (Table 25). Whilst in general rural areas have smaller households than urban areas, despite their much higher rates of general fertility, in the large cities the trend is reversed, and both Mashhad (4.21) and Tehran (4.29) have fewer persons per household than Urban Iran (4.61) and Urban Khorasan (4.23). This apparent anomaly can be explained by several factors. Firstly, whilst it is true that in rural areas there are more children per female of reproductive age (Chap.7) and that in general the extended family is more cohesive than in urban areas, houses are physically small, but relatively easy to obtain and cheap to construct (out of mud) so that the extended family is split up into smaller, but neighbouring households. This is particularly noticeable in rural Khorasan, where the dominant settlement type is a village of contiguous mud houses, surrounded by

a wall, and fronting onto a rectangular yard, a situation in which family ties are strong despite the small size of individual housing units. Smaller urban areas, whose general fertility ratios are not much lower than the rural areas, tend to have the largest average household size. The extended family is still important, but the opportunities for cheap housing are fewer, and so a large household size is the result. However, in the large cities, the average household is much smaller in size than elsewhere. The lower general fertility ratio no doubt contributes to this, but equally important is the trend, noted above, for smaller families, often split up by in-migration (parents or wives may be left at home in the village for some period) to occupy large houses in central areas, many households to one dwelling unit. This contributes both to the small average size of household, and to the large numbers of persons per dwelling unit, both of which are evident in Mashhad. Because of these trends, the structure of households is somewhat different in urban and rural areas.

Table 26 PERCENTAGE DISTRIBUTION OF FAMILY TYPE, URBAN IRAN, 1959

	32 cities	22 small cities[1]	Tehran	Mashhad
(1) Single Person	4.3	4.4	5.4	5.0
(2) Husband, wife, non-married children	64.7	65.3	66.0	68.5
(3) Husband, wife, children other adults	28.8	28.3	26.3	26.5
(4) Adults only	2.3	2.0	2.3	0.0
(5) Total number of families	3,237	1,123	609	182

Source - Bank Markazi Iran. 1959-60, op.cit.

1. below 100,000 persons

Table 26 indicates that due to lower rates of general fertility in the urban areas, the proportion of households consisting of the familial unit (husband, wife, unmarried children) is only about 68%, whilst there exists a large minority of households in which 'other adults' are present - up to 28%. This is as one might expect, since the proportion of adults in urban areas has been shown to be large, whilst there are fewer children and old people (Chap.7). Unfortunately, figures for rural areas comparable to those of Table 26 are not available, but it is probable that under the prevailing conditions of high fertility, and a youthful age structure, the rural areas have a larger proportion of households of the 'familial' type and fewer in which 'other adults' are members.

3. CO-RELATIONS OF HOUSEHOLD SIZE

Observations in this section are based on data, published and unpublished obtained in a sample survey of Urban Consumption Expenditures and Income undertaken by the Bank Markazi, Tehran, in 1959-60. This survey is a random sample of 3237 households in 32 cities in Iran, 10 large, and 22 less than 100,000 and was designed to be representative of Urban Iran as a whole. Details are given in Appendix C,3. Data on the relationship between household size and other variables, whilst available for Mashhad, could not be utilised, since the sample population for Mashhad is only 182 households, and sampling errors are too large. Instead, details were calculated for urban Iran generally, and as a check, similar results were included in the table(27)for Mashhad.

Table 27 Some Co-relations of household size . A Urban Iran, B Mashhad

I. Household size (number of persons)		1	2	3	4	5	6	7	8	9	10 or more	X	Y
Mean household net money income (rials per annum)	A	30801	39927	44876	61762	58908	77436	76994	98756	105083	156491	+.93	<.001
	B	16482	26517	24989	51213	61865	43994	60156	75784	327480	407234	+.78	<.01
Mean household per capita net money income (rials per annum)	A	30801	19993	14958	15440	11781	12906	10999	12344	11676	15649	-.56	[.05-.10
	B	16482	13259	8329	12803	12373	7332	8594	9448	36387	40723	+.28	>.10
Mean household expenditure (rials per annum)	A	35868	49718	59288	74862	83847	96787	102859	123629	121496	209509	+.99	<.001
	B	16368	36229	55498	48051	78949	65393	97256	83510	203013	253611	+.96	<.001
Mean household per capita expenditure (rials per annum)	A	35868	24854	19762	18715	16769	16131	14694	15453	13500	20951	-.65	[.02-.05
	B	16368	18171	15073	12001	15787	10999	13899	10438	22557	25361	+.08	<.10

II. Number of years of schooling of head of household		No schooling: Illiterate	No schooling: Literate	1-6 years of schooling	7-10 years of schooling	11 or more years of schooling	X	Y
Mean household size (persons)	A	4.7	5.4	5.2	5.3	4.9	+.10	>.10
	B	4.3	5.3	5.7	4.6	5.8	+.70	.05-.01

III. Age of head of household (years)		less than 25	25-34	35-44	45-54	>55	X	Y
Mean household size (persons)	A	3.4	4.4	5.5	5.4	4.9	+.60	>.10
	B	3.1	4.3	5.9	5.8	4.2	+.30	>.10

IV. Work status of head of household		Retired, on relief or unemployed	Private employee	Government employee	Self-employed	Employer	X	Y
Mean household size (persons)	A	3.7	4.4	5.3	5.2	6.1	+.90	<.01
	B	3.4	4.4	5.8	4.9	6.2	+.90	<.01

V. Tenure of dwelling		Rent free	Rented	Owned
Mean household size (persons)	A	5.4	4.3	3.8
	B	5.5	4.1	4.1

X Spearman's Rank Correlation Coefficient

Y probability of X occurring by chance

A. Urban Iran

B. Mashhad

Calculated from - Bank Markazi, op.cit. 1959-60

From table 27 it is clear that there is a marked correlation between household income (+0.93), household expenditure (+0.99), and household size.[2,3] The larger households thus have larger incomes, and possibly more wage earners in them than do smaller households. However, mean per capita income and mean per capita expenditure are for Urban Iran both inversely related to household size, their respective rank correlation coefficients being -0.56, and-0.65. This implies that as households increase in size their per capita income decreases, and so the larger households are also the poorer ones. However, this inverse relationship is only marginally significant statistically since the coefficients are not very low, and so little reliability can be placed upon it. For the much smaller sample of Mashhad city, no real linear relationship between per capita income or expenditure and household size can be said to exist, since the coefficients are small and non-significant. There may however be a positive trend, since the coefficients are +0.28 and +0.08. This is due both to real differences between Mashhad and the rest of Urban Iran, and to statistical deficiencies in the available data.

Literacy of the head of household (table 27,II) does not have a linear relationship with household size for Urban Iran, although it would appear that within the literate group of heads of households, household size tends to decline with increasing literacy. Illiterates however some-what surprisingly have smaller households than do literates generally. In the face of this evidence, the coefficient of +0.70 for Mashhad, suggesting that household size increases with literacy, may be unsound.

There is a positive relationship (Table 27 III) between age of the head of household and household size, up to the age of 65, which is late in life for Iran. After age 54, household size not unexpectedly declines, and so the coefficient (+0.6) is not a high one. Worker status (27,IV) is also directly correlated with household size, and as status increases along the scale from unemployed through private employee, government employee, self-employed to employer at the top, so households increase in size for both Urban Iran and Mashhad. The fact that household size and income are related no doubt contributes to this situation. The last part of the table (V) serves to indicate that owner-occupiers of houses tend to have larger households than do tenants - possible because the 'family house' is a strong force for the cohesion of the extended family within it.

Finally, the relationship between household size, mean household net money income, and physical size of household (number of rooms) is considered in table 28, for Urban Iran. The number of rooms per household increases directly with household income (+0.99) and also with household size (in number of persons) (+0.93), both of which relationships are highly significant statistically. The result is that density as measured by the number of persons per room has a slightly negative relationship (-0.24) with increasing household income. However, this last correlation is not significant statistically. Since we have seen in table 27,I,that as household income increases, per capita household income declines, then the implication of table 28 is that it is the larger families who are the poorest

Table 28 Household size - rooms per household - income. Urban Iran 1959-60

Mean household net money income (000's rials)	0-5	5-10	10-15	15-20	20-25	25-30	30-40	40-50	50-75	75-100	100-150	150 and over	X	Y
Mean number of rooms per household	1.23	1.59	1.60	1.71	1.61	1.93	2.01	2.19	2.44	2.97	3.45	4.70	+.99	<.001
Mean number of persons per household	2.64	2.69	3.43	4.04	4.16	4.47	4.84	5.03	5.60	5.94	6.03	6.23	+.93	<.001
Mean number of persons per room	2.15	1.69	2.25	2.37	2.59	2.34	2.40	2.29	2.30	1.96	1.75	1.33	-.24	>.10

Calculated from Bank Markazi, op.cit. 1959-60

Y - % probability of X occurring by chance

X - Spearman's Rank Correlation Coefficient

(per capita) and live at the highest densities in terms of the number of persons per room.

In summary we can see that for Urban Iran, as household size increases:-

(i) per capita income and expenditure decline

(ii) heads of households tend to be (a) either illiterate or well educated but not in between, (b) are older, (c) have a higher work status, and (d) tend to be owner-occupiers, not tenants.

(iii) The household tends to live at higher densities in terms of the the number of persons per room.

The same relationship may exist for Mashhad, except that there is no clear relationship between household size and per capita income (though there may be some sort of positive trend) and it may be that larger households have more literate and better educated heads. However, some of the correlations attain only a low or moderate level of statistical significance and so the trends outlined are to be treated with the greatest caution. The low levels of significance are a product of both the crudeness of the summary statistics available and the fact that there is sometimes great variation about the (assumed) linear relationships. Clear-cut social variables and distinct social classes are not yet fully formed in Urban Iran, and particularly in Mashhad, where society still has many remnants of a former vertical type of structure based on kin, not class. It is fairly clear that a society based on horizontal division by class is emerging, but it is in its infancy and has many gaps, particularly in the middle ranges of income and social status. However, the relationships do have some importance, since they are reflected in the distribution of

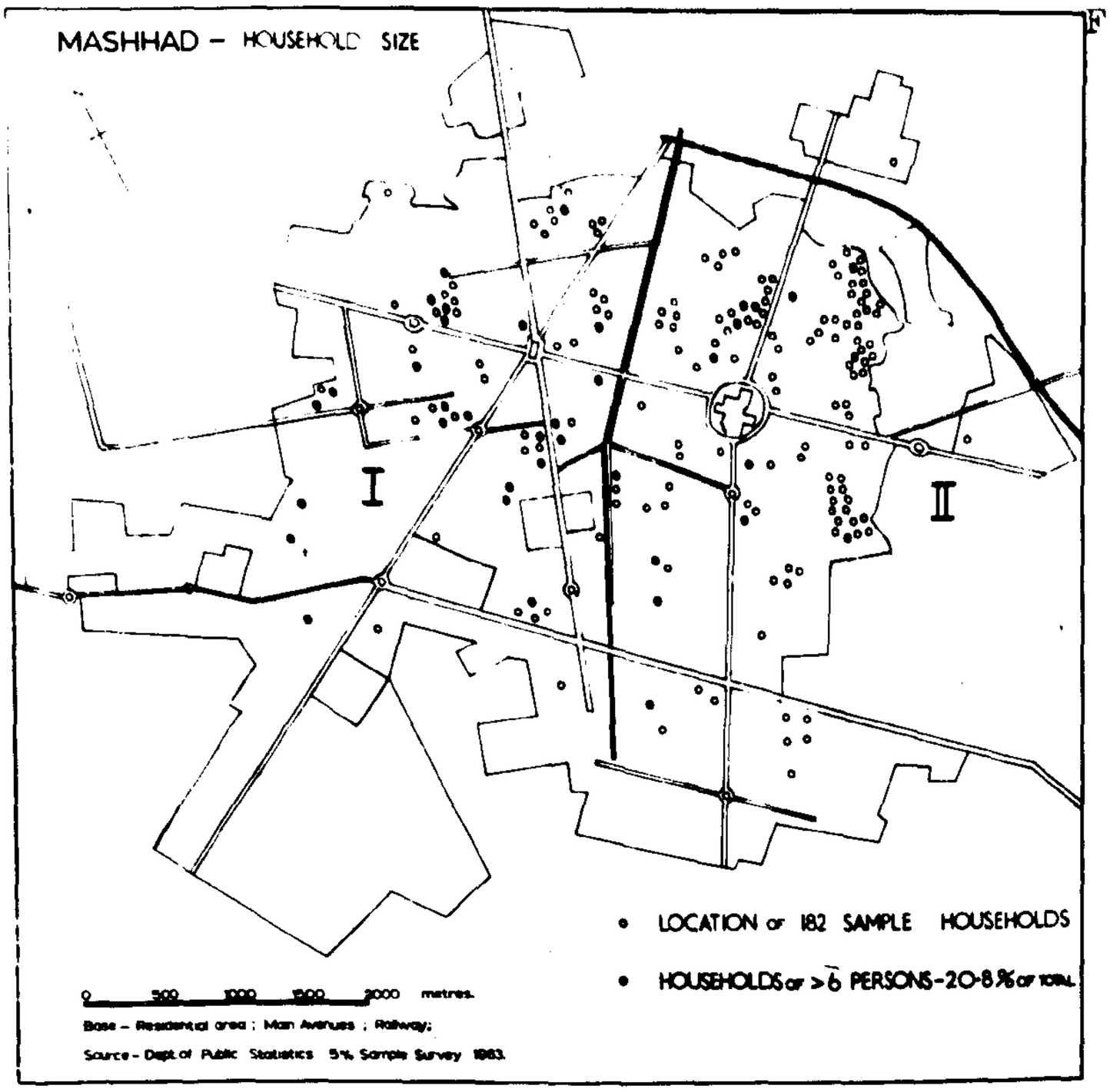


Fig. 24 A.

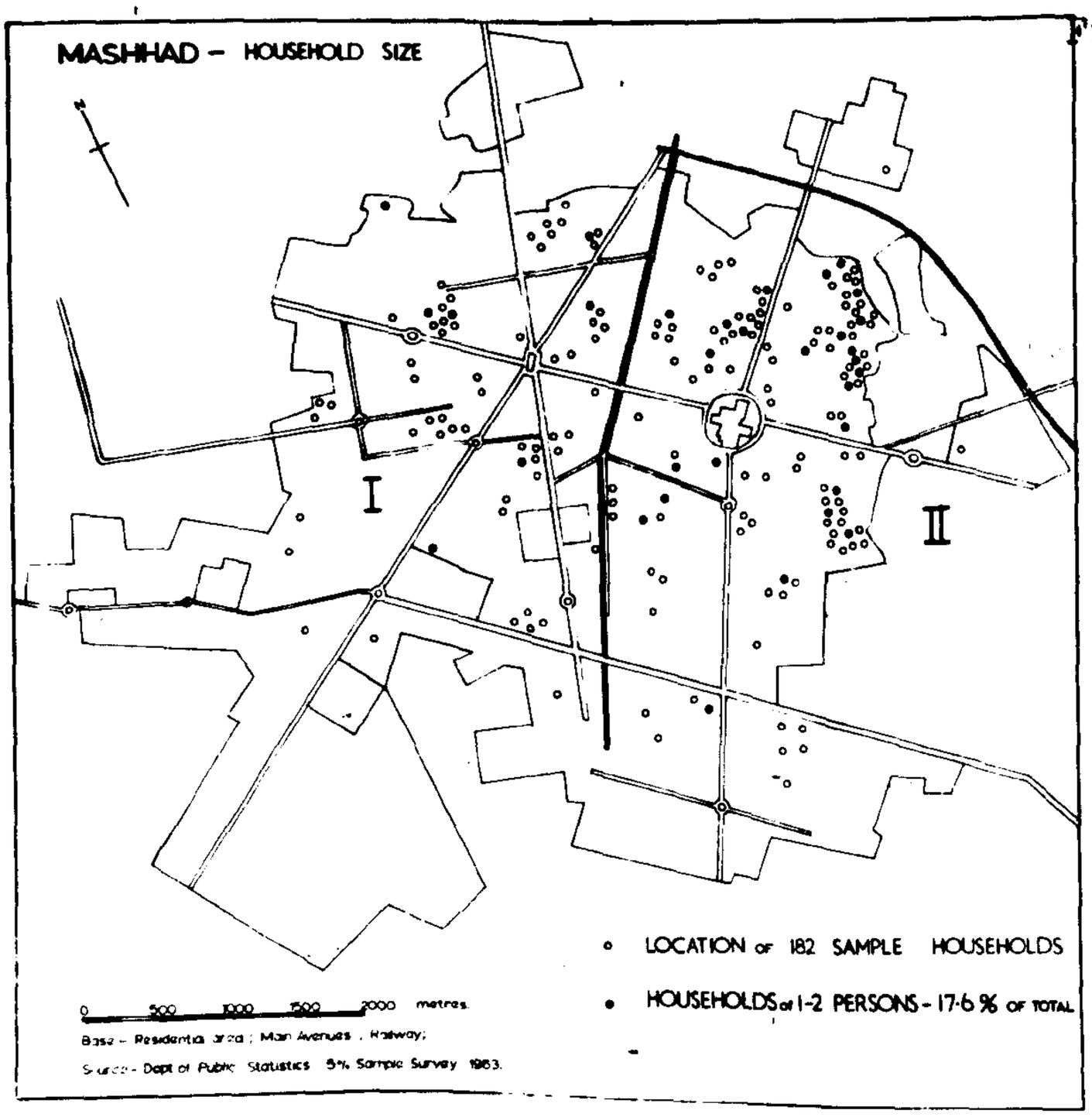


Fig. 24 B.

household size to be considered below.

4. DISTRIBUTION OF HOUSEHOLDS BY SIZE - MASHHAD

Two maps of households were constructed; one (Fig.24 A) is of the largest 20.8% households, those of more than 6 persons, and Fig 24B is of the smallest 17.6%, households of 1-2 persons. This was done since the sample total (182 families) was too small to allow sub-regions of the city to be identified, and in any case it would be a misleading statement of the evidence to suggest that 'regions' of household size exist. The most characteristic feature of the maps is the intense variation of household size across the city - a mixture of large with small households. Measures of central tendency for sub-regions, such as the mean or mode, would be of little value because of this. The sample distribution is a random one, and so most of the sample households are in the most dense areas of the city - the old town. Yet despite this it does seem that there is a trend in the distribution, with smaller households in the old town, and larger ones in the new town. But this is a subjective impression and may not be valid, so it was decided to test whether this trend does in fact exist. The maps were divided into two sectors, east and west, which correspond very roughly with the old town and the new town. For each sector the number of households falling into the particular size class under consideration (1-2 persons, and more than 6 persons) was compared to the total number of sample house-holds. This procedure, repeated for each map, yields two 2 x 2 contingency tables which were then tested by chi-squared[4] against the null hypothesis that in each case the households were distributed merely proportionally to the sample households of each sector.

Table 29

Distribution of Household Size in two sectors of Mashhad
(explanation of Figs. 24 A and B)

	I New town-west	II Old town-east	Total
A. Households with more than 6 persons (upper 20.8% of total)			
Total households in sample	65	117	182
Total households in class A	24	14	38
Percent of total in class A	36.9	12.0	20.8
Chi-squared value	8.17	4.37	12.54
Significance of null			> .001
B. Households with 1 or 2 persons (lower 17.6% of total)			
Total households in sample	65	117	182
Total households in class B	7	25	32
Percent of total in class B	10.8	21.4	17.6
Chi-squared value	1.69	0.94	2.63
Significance of null			.10-.20

The results (Table 29) show that in the case of the largest households (Fig.24 A) it is extremely improbable(less than 0.001 P) that the distribution could hage occurred by chance, or that it is proportional to the total sample population. For the smallest households, the probability value is 0.1-0.2 so that we can be less sure that the distribution could not have arisen by chance. However, in the first case, (Fig.24 A) it appears that only 12% of the households of the old town have 6 or more persons, whilst 36.9% of those in the new town are of this large size. In the second case (Fig.24 B), though

this is only marginally significant, 21.4% of the households in the old town have 1-2 persons in them, whilst only 10.8% of the households of the new town are in this smallest category. Thus it is clear that both for the sample and the total population of Mashhad, the old town is characterised by many households of small size and few large ones, whilst the new town reciprocally has many of the larger households, and few of the small ones.

5. SUMMARY AND CONCLUSION

The implications of the relationships and the distribution presented are numerous and important. The correlation between household income and household size is high and positive (+0.78) which means that the larger households of the new town are also in general the wealthier. However there is little correlation between household size and per capita income (+0.28), and it is not certain that these larger households are wealthier in per capita income - though the possibility does exist, and further evidence in chapter 12 is reviewed which confirms this. Other correlations noted indicate that for Mashhad the heads of the larger households tend to be literate, even well educated, are older, have a high work status, and tend to be owner-occupiers, not tenants, whilst their households tend to live at higher densities (persons per room). Some of these correlations are corroborated by evidence presented independently in other chapters. Thus in chapter 8 it was shown that the new town has higher than proportionate rates of literacy, which is the implication here, since high literacy and household size are positively correlated, and larger households have a new town distribution. The structure of occupations (chapter 9) showed also

that it is the new town zones in which workers of higher status are living. The map of gross residential densities Fig.11, chapter 6 indicated that it is the old town which is most densely peopled, but if measurements of the numbers of persons per room were possible it might be the case that some new town houses, with large families, would appear relatively dense.

Thus the evidence of this chapter, presented in terms of correlation, tends to emphasise conclusions previously arrived at elsewhere by consideration of the same variables independently, and forms a basis on which to build up a more comprehensive statistical picture of the two populations, old town and new.

Notes to text, and references

1. From U.N. Demographic Yearbook 1962

2. Both income and expenditure are used here, although the former is the more convenient of the two, it is often inaccurate, as is admitted in Bank Markasi Reports. Expenditures are on the other hand more accurate, but are not such a direct measure of wealth (Appendix C,3)

3. The correlation used is Spearman's Rank Correlation Coefficient, described in Appendix B,3

4. Chi-squared test, Appendix B,2.(b)

11. MOVEMENTS OFPOPULATION

1. Introduction

2. Some comparisons

3. Origin of in-migrants

4. 'Push' and 'Pull' factors.

   (a) The southern part of the province

   (b) The northern part of the province

5. The structure of in-migration in Mashhad

   (a) method

   (b) evaluation of the maps:-

      i. Proportion of population 'recently' in-migrant

      ii. Distribution by origin of the 'recently' in-migrant population

      iii. 'Recent' internal migration within the city

6. Summary and Conclusion

1. INTRODUCTION

The incidence, type, and pattern of migration, and in particular the urban-rural aspects of it, are perhaps the most important single factor in the process of growth in cities of the underdeveloped world, and studies of migration are vital to the understanding of the many variables at work in an urbanising society.

2. SOME COMPARISONS

By its nature however, the topic is an elusive one, and comparable data for different countries are not readily available. The 1956 Census of Iran listed as migrants (persons now living in a shahrestan[1] other than that of their birth), 2,081,082 persons, or 10.9% of the total population in 1956. This figure is high in relation to a similar measurement for India, available for several years, in Table 29 (though here, the states are much larger than Iranian shahrestans). As Bogue and Zachariah (1962)[2] point out, however, this type of statistic is by no means an adequate measure of internal migration within India, and has been misinterpreted in the past as indicative of the relatively low levels of physical mobility possessed by the Indian peasant-villager. In fact, much of the rural-urban migration taking place in India is from the rural areas of one state to towns in the same state, and goes unrecorded in a measurement such as this - and the same situation would appear to be true for Iran. Bogue and Zachariah[3] estimate that during the period 1941 to 1951, about 9,000,000 persons migrated to the urban areas of India from rural areas, making up about 15% of the total urban population of 1951, whilst in-migrants, defined simply as all those persons not born in towns, but now living in them, were 20% of the total 1941 urban

population.

Table 29 INDIA. PERCENT OF POPULATION LIVING IN A STATE OTHER THAN THAT OF BIRTH

Date	%
1951	3.1
1931	3.6
1921	3.7
1911	3.6
1901	3.3

Source Bogue and Zachariah op.cit.
p.29 quoting Census of India 1951.

Comparative figures for Iran are not available, and we have to rely on the cautious interpretation of population change data, derived from a consideration of the 1956 census, and the 1963 Sample Survey, for a quantitative assessment of the situation - provided in Table 9 Chapter 7, and Table 30. Table 30 was first weighted by the different values obtained for the general fertility ratio (Table 13 chapter 7) — since urban-rural differences, though slight, are important. The ratio for Iran was fixed at unity (1.000), and a table of weights for other areas was calculated. These weights were then used to adjust the gross change in per-cent per annum, 1956-63, listed for selected areas in Table 30. By subtraction the rate of natural increase and estimated rates of change due to migration were calculated. The numbers involved for the seven year period were then inserted.

PAGE
NUMBERS
CUT OFF
IN
ORIGINAL

TEXT BOUND INTO

THE SPINE

Text cut off in original

IRAN, ESTIMATED POPULATION CHANGE, CENSUS PROVINCES AND OTHER AREAS, 1956-63, in PERCENT PER ANNUM

Area	Gross Change %	General Fertility Ratio Weight	Change by Natural Increase Total (7 years)	% p.a.	Net Change by Migration Total (7 years)	% p.a.
Iran	+2.689	1.000	+3,568,249	+2.648	+43,848 (1)	+0.041
Rural Iran	+2.174	1.048	+2,564,605	+2.818	-586,091	-.644
Urban Iran	+2.524	.880	+735,509	+2.366	+49,300	+.158
TEHRAN	+7.605	.788	+224,287	+2.119	+580,639	+5.486
Khorasan	-.804	.938	+354,418	+2.522	+467,405	-3.326
Rural Khorasan	-2.143	.925	+274,654	+2.487	-511,318	-4.630
Urban Khorasan	+4.039	.819	+28,969	+2.022	+24,168	+1.837
MASHHAD	+4.144	.778	+35,436	+2.092	+34,759	+2.052
Fars-Banader	+3.143	.896	+222,395	+2.409	+67,853	+.734
Rural Fars Banader	+3.254	1.118	+197,485	+3.006	+16,293	+.248
Urban Fars-Banader	+1.197	1.033	+41,111	+2.778	-23,397	-1.581
SHIRAZ	+4.947	.826	+26,544	+2.222	+32,553	+2.725
Isfahan-Yazd	+2.936	1.015	+288,947	+2.729	+21,931	+.207
Rural Isfahan-Yazd	+5.535	1.051	+183,835	+2.826	+17,620	+2.709
Urban Isfahan-Yazd	-5.819	.980	+60,787	+2.635	-195,027	-8.454
ISFAHAN	+4.779	.826	+39,617	+2.222	+45,590	+2.557
East Azerbaijan	+3.732	.981	+395,598	+2.638	+157,307	+1.049
Rural East Azerbaijan	+4.146	1.026	+308,607	+2.759	+155,142	+1.387
Urban East Azerbaijan	-.115	.902	+43,176	+2.425	-45,223	-2.540
TABRIZ	+4.818	.812	+44,314	+2.183	+53,489	+2.635

Sources, Census of Iran 1956; Sample Survey of Iran 1963.

1. Excess due to net international migration

* Urban areas other than the respective capital.

From an inspection of Table 30 it is reasonable to deduce that there is a general marked migration from rural to urban Iran, whilst the capital, Tehran, stands out with an increase due to migration of +5.486% per annum, equivalent to well over half a million in-migrants over the seven year period. Khorasan in general had a net loss of population during this period, due to excess out-migration, as well as to rural-urban migration within the province. Mashhad is growing fastest by migration (+2.1% per annum) whilst the rest of 'urban' Khorasan also shows a net increase (+1.8% per annum) due to migration. Thus the large rural loss of population (gross -2.1% per annum; migration - 4.6% per annum) is a logical correlation of this situation, and one can hypothesize movements of rural people to urban areas of Khorasan, as well as to places, urban and/or rural, outside it, resulting in the net loss referred to above, for the province as a whole.

For comparative purposes the cities of Shiraz, Isfahan , and Tabriz, were also considered within their respective provinces, in terms of migration. (Table 30). In all these cases, the province has increased by migration, though at a rate much less than the natural increase. However, within all three, the rural population has continued to grow by net migration, whilst it is in the 'urban' areas other than Tabriz, Shiraz and Isfahan, that net losses are recorded. The implication is that in these provinces much significant movement might well be from small 'towns' to big city — whilst in-migration from outside the respective province is taken up in rural areas, partially due to nomad re-settlement, which has been taking place in all three.

Lack of data on actual movements as distinct from potential or probable movements makes further comment impossible - but clearly the situation in these provinces is quite distinct from that of Khorasan, possibly a function of the latter's relative isolation in the east.

A consideration of Table 31 enables us to return to a more constructive view of the national situation, and its comparison to that of India. This table indicates the estimated proportions of the population of urban Iran, and five large towns made up of in-migrants resident for seven and for less than ten years. The latter was calculated, assuming that rates of in-migration for the ten year period to be similar to those for the seven year period, by expressing the total increase for 1956-1963, derived from Table 30, as a percentage of the 1963 population, and multiplying by ten over seven.

Table 31

PERCENT OF POPULATION 'RECENTLY' IN-MIGRANT, URBAN IRAN and FIVE LARGE CITIES

Area	Seven year period	Estimation for ten year period 1953-1963
Urban Iran	12.10	17.26
Tehran	25.06	31.51
Mashhad	11.13	15.54
Shiraz	14.16	20.22
Isfahan	13.41	17.17
Tabriz	13.79	19.70

Sources - Census of Iran 1956; Sample Survey of Iran; 1963

Urban Iran by this estimation had 17.26% of its population 'in-migrant' less than ten years - the comparable figure for India in 1951 was 15%[4]. Of the five cities considered, Tehran had the greatest population in this class, 31.51%, whilst Mashhad appears to have only 15.84%. This figure however is almost certainly too low, since, as will be seen, the 1963 Sample Survey of Households in Mashhad yields a figure of 17.5% which itself is likely to be lower than for the total population, since many in-migrants (especially of recent vintage) are not in fact living in households. The relative rank of the cities in terms of this proportion is probably correct, since it corresponds well with the figures of percentage growth per annum by net migration in Table 30. This means that despite the cosmopolitan nature of the city of Mashhad, with 3.9% of its in-migrants born in foreign countries, and despite its inter-regional and international religious significance, its growth by migration is probably only of the same order as that of urban Iran in general, if not less, probably due to its isolation in the east.

3. ORIGIN OF IN-MIGRANTS

The 1956 Census provides some data on the original birth place of the persons migrating into the Mashhad Census District (almost all of whom can be assumed to be in Mashhad itself, in fact). However, it is at pains to point out that these persons may not have migrated directly from their place of birth to Mashhad, and indeed stresses that migrants tend to have many places of abode during their life-time.

Table 32

LIFETIME MIGRATION BY CENSUS PROVINCE OF BIRTH TO MASHHAD CENSUS DISTRICT, 1956

Census Province	Number of Persons	Percent of total migrants to Mashhad C.D.
Khorasan	41,301	53.7
Yazd-Isfahan	8,569	11.2
Central (Tehran)	5,291	6.9
East Azerbaijan	4,443	5.8
Sistan-Baluchistan	3,608	4.7
Kerman	3,346	3.9
Mazanderan-Gorgan	2,983	4.4
Gilan	1,767	2.3
Kermanshah	1,025	1.3
Khoosestan-Luristan	612	0.8
Fars-Benader	577	0.8
West Azerbaijan	175	0.2
Kordestan	86	0.1
Foreign	3,008	3.9
Total	76,791	100.0

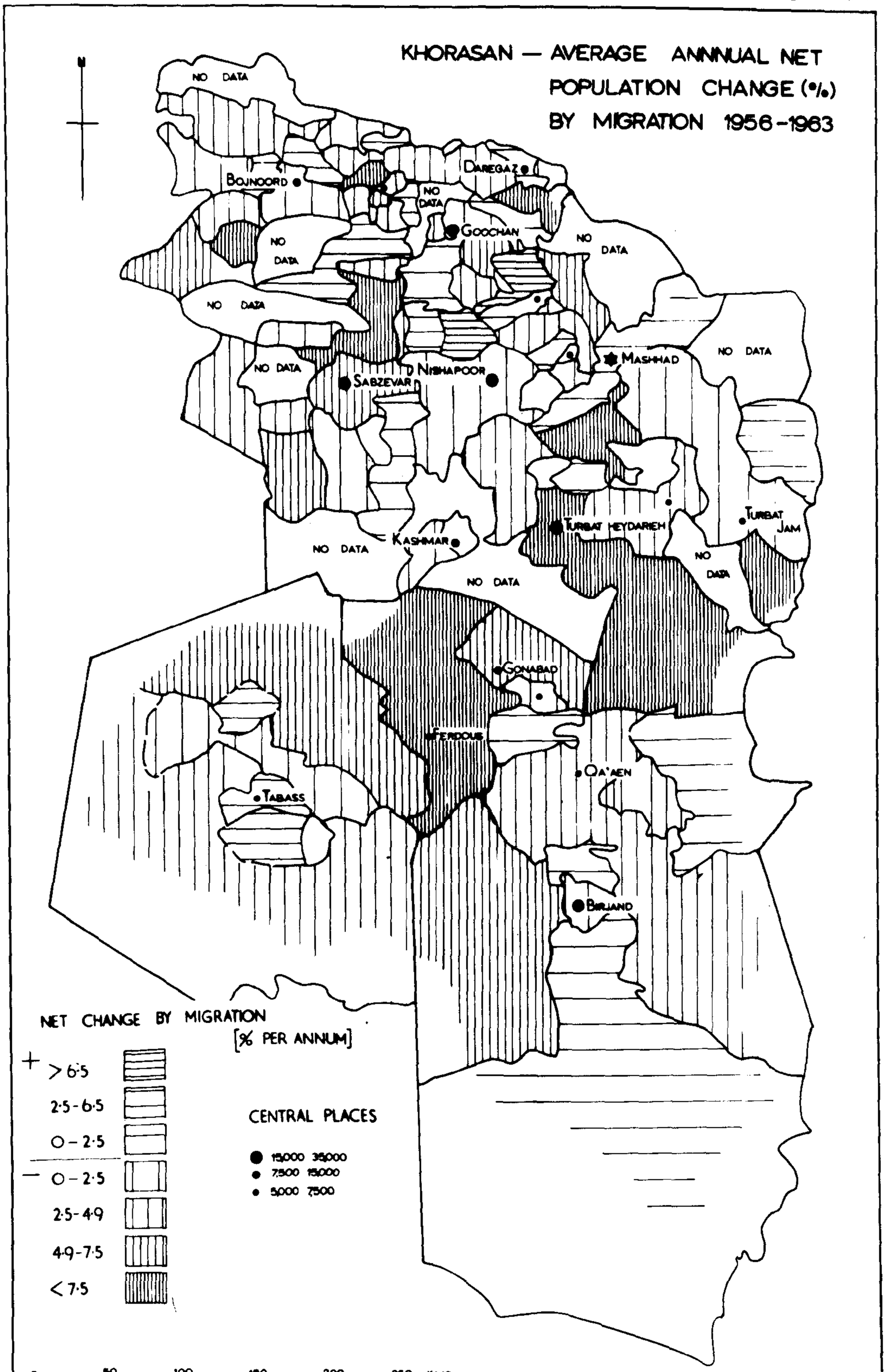
Source, Census of Iran, 1956

The breakdown is given in table 32. The relationship between numbers migrating, size of population base at the point of origin, and distance from Mashhad, is not a simple exponential, and a gravity model constructed was not adequate to 'explain' the distribution observed. This may be partly due to the qualifications about the data pointed out above, but is equally likely to be due to the fact that Mashhad, because of its physical isolation from the rest of Iran, cut off by the central deserts, has a sphere of influence restricted to a smaller area but more intense than would otherwise be the case. This too might be a factor behind the low proportion of recent in-migrants (discussed above) in the city, relative to Shiraz or Isfahan for example. Thus 53.7% of the in-migrants are from

Khorasan itself, a fact which corroborates the points made by Bogue and Zachariah (1962)[5] earlier. Moreover the next largest, (apart from the Central Province with its large population - 2.7m in 1956) is Yazd and Isfahan - and particularly the latter, located well out into the desert, whose citizens are common in Mashhad; and Sistan, Baluchistan, and Kerman, all in the south, but able to communicate with Mashhad along the higher, and less obstructive eastern edge of the central desert.

For reasons of convenience, it is proposed to concentrate on the 53.7% coming from within the province of Khorasan itself, for which it has proved possible to draw up a detailed map of population change due to migration alone, using the smallest administrative unit available, the dehistan[6](Fig.25). This map refers only to the rural population of the province, and was drawn up assuming that the annual percentage rate of natural increase was the same in all parts of the province, viz, 2.49%, a rate calculated in Table 30.

The gross changes obtained by comparing the 1956 to the 1963 data (from the Malaria Institute)[7] were then weighted by the figure 2.49% to give change by migration in per cent per annum. The mean for those parts of the province for which data was available, is -2.78% per annum for the seven year period. This is much smaller than the figure obtained in Table 30 of -4.63% per annum, and so the map is a very conservative estimate of the severe net loss of population that rural Khorasan is undergoing.


KHORASAN — AVERAGE ANNNUAL NET POPULATION CHANGE (%) BY MIGRATION 1956-1963
N
NO DATA
BOJNOORD
DAREGAZ
GOOCHAN
MASHHAD
SABZEVAR
NISHAPOOR
TURBAT HEYDARIEH
TURBAT JAM
KASHMAR
GONABAD
FERDOUS
QA'AEN
TABASS
BIRJAND
NET CHANGE BY MIGRATION [% PER ANNUM]
+ > 6·5
2·5 - 6·5
0 - 2·5
— 0 - 2·5
2·5 - 4·9
4·9 - 7·5
< 7·5
CENTRAL PLACES
15,000 35,000
7,500 15,000
5,000 7,500
0 50 100 150 200 250 KMS.
SOURCES OF POP. DATA — CENSUS OF IRAN 1956.
INSTITUTE OF MALARIA - (UNPUBLISHED).

The discrepancy between the two figures is a product of overstatement in Table 30 due to inadequacies in the 1963 Sample Survey, and partially to the fact that some dehistans, which almost certainly have very marked declines, have been excluded due to unreliability in the data. Despite this, it is clear that rural Khorasan is fast being de-populated.

4. 'PUSH' AND 'PULL' FACTORS

In the light of this, there are two obvious questions that must be asked -

(a) Where are the out-migrants going? - the answer to which could provide us with an idea of the 'pull' factors.

(b) Where in particular are they coming from? - the characteristics of the areas involved giving some assessment of the 'push' factor.

The answer to the first question would seem superficially to be obvious - that the outmigrants of the rural areas are the in-migrants to the towns, and since we are not interested in the deeper sociological aspects of the situation, this should suffice. However, as earlier observed, since not only rural Khorasan, but Khorasan as a whole is declining in population due to migration, then a large proportion of the outmigrants must be leaving Khorasan, and their destinations, urban or rural, are unknown. However there is heuristic evidence to suggest that some rural-rural migration may well be taking place. So the detailed nature of the 'pull' factor, at least outside Khorasan, must go undetected, to await future sociological

depth study.

The answer to the second question can, at least at a subjective level, be dealt with in more detail and the relative preponderance of the two factors in different parts of Khorasan can be assessed.

A. <u>The Southern Part of the Province</u>

South of Kashmar and Turbat Heydarieh, (Fig.25) most of the province is desert or semi-desert, increasing in severity southwards and westwards, and it is only in the oases, usually around a small central place such as Tabass, Ferdous or Gonabad, that increases by migration are observed. Elsewhere, the heaviest declines as much as -8.5% per annum, are apparent. In effect, a process of 'rationalisation' both in agriculture and (consequently) in population distribution is taking place, and areas marginal or sub-marginal to productive agriculture are going out of cultivation, whilst the desert encroaches. This process, evident in the existence of the two cohesive in-migrant colonies of Qa'aeni and Sistani in Mashhad, already referred to (Chap.6) is perhaps an inevitable consequence of the gradual commercialisation of agriculture taking place as economic development continues, not only in Khorasan, but generally in other marginal areas of Iran. Thus sub-marginal areas which yielded grudgingly a subsistence form of life in the recent past, are no longer practicable as the 'cash' economy invades even the most remote sectors of Iranian society.

Technical aspects of the situation, such as over-grazing of the very limited supply of spontaneous vegetation, and a series of dry years, are no doubt contributing to the situation. However, as land-reform gains pace,

a more severe factor is evident. It is generally agreed[8] that land-reform is working, and is going to work best (and perhaps only) in the better watered and more prosperous areas of Iran, which incidentally in the past have attracted most of the limited amount of investment. Northern Khorasan is one of these areas. This, it is believed, is because the landowner, the former supplier of capital and seed, and the agency for repair of the expensive qanat system after flood or earthquake, is being removed from the system, and peasant co-operation and mental fitness for the task of capital accumulation and investment is by no means as effective in many cases - especially in these sub-marginal areas of the south.

Moreover, it was clearly often the case in large land ownings in this area , that the landlord (probably unknowingly) was using the returns from share cropping in his more productive villages, usually near the centre of the oases, to subsidise the sub-marginal areas on the fringe, providing seed and capital goods without adequate return. Obviously as the landlord is removed, then these sub-marginal areas are no longer going to be subsidised and will, therefore, tend to decline.[9] Whilst this is perhaps an excellent process in terms of agricultural efficiency, it spells disaster on the social side of the scales, for the point at which decline sets in can be swift and dramatic. Thus the collapse of a qanat by flood, when labour and capital for its repair are not immediately available, or lack of rain for two or more successive years, can cause disaster in this precarious economic balance. The

Agricultural Bank, and the Sugar Beet Factories, (national and private) are, not surprisingly, reluctant to extend loans to areas with so little prospect of returning them.

In such circumstances there are two simple alternatives present in various degrees of severity - starvation, or movement, at least of perhaps part of the family, under-employed in any case, to an area of possibly greater opportunity. This is often hardly in the nature of a decision, but more an acceptance of the inevitable, and in such circumstances it is the poorest and the landless who are being 'pushed' first, those who under land reform were mentally ill-equipped or could not afford to take on a piece of land within the co-operative, with its prospect of years of re-payment. Pathetically, it is just those people least able to adapt to an urban environment who must in fact do so, travelling large distances to do it.

B. The Northern Part of the Province

In the more populous, prosperous, well-watered north, other factors are at work, as well as similar ones in a different guise. Generally, the 'push' factor is much less strong, and the 'pull' factor is thought to be more important, especially since proximity to Mashhad, or to other smaller towns, is to be measured in scores, not (as in the south) in hundreds of miles.

A few areas of the north are sub-marginal, particularly in the Kuh-i-Binalud mountains, North of Sabzevar, and in the northern mountains around Daregaz, where heavy declines are apparent on the map (Fig.25). For the

most part, however, whilst decline is general, it is

(a) interspersed with areas of increase,

(b) of a lower order than in the south,

(c) but involves many more people.

Thus, despite the obvious fertility and general prosperity of the Kashaf Rud valley, one of Iran's richer regions, and despite substantial investment in sugar beet plant and the growth of the Mashhad market, decline by migration continues, - and this is to be regarded as a product of 'pull' rather than 'push' factors.

It is clear that although the Census statistics show the occupations structure for the rural part of the Mashhad Census district to be similar to that of rural Khorasan as a whole, the structure in the area of the Kashad Rud Valley, particularly between Mashhad and Goochan, is different. Here, it is believed, there is a smaller proportion of the employed population in agriculture, and a correspondingly larger section in other occupations - whilst many of those normally in agriculture have other part-time non-agricultural activities. Thus it is often the case for example that (within 20 kilometres of Mashhad) the person in the village with a bicycle will act as dairyman, taking cans of milk to Mashhad. The specialist in 'night-soil' collection is another city visitor, and many others find it necessary to visit Mashhad as spokesmen for the village in respect of sugar-beet contracts, land-reform proceedings and other activities.

Equally, the area within about 100-150 kilometres of Mashhad, especially that part of it near the two main routes, is becoming increasingly commercialised in its type of agriculture, in the face of high demands

for food from the city. Thus the small vegetable plots which each share-cropper was in the past allowed to maintain, have been in places ploughed out to make more room for sugar-beet, melons, and (less commonly) wheat. This itself pushes the village into a dependence on cash economy so that village shops are now appearing, the owner bringing from the town dried peas, beans, coca-cola, and crudely manufactured plastic or metal-ware, replacing local clay-ware.

Thus, in the north, the city is penetrating into the countryside and it appears that it is just those people who carry its influence, those in non-agricultural occupations, often the more enterprising, from whose ranks the in-migrants are coming. The process is much less a desperate measure for survival (as in the south) and much more a desire to increase the family income, and to partake in a life of innovation, experiencing new horizons of the wider world, far removed from the village. Examples of this type of migrant are common in the city. The eldest son of a Radkan family, for example, literate, and working as clerk to the merchant who had recently begun to buy produce from the village, was living in the town, sending money home, visiting his village - and being visited by members of his village community. Another, an illiterate son of a family in one of the mountain villages south of the city, was working in a small unit producing shoes, whilst the rest of the family continued to cultivate their village land. Visits in this case utilised the twice-weekly timber lorry, which in the summer and autumn collected construction timber from the village (Khanrud) where it is grown as a cash 'crop'.

Thus few persons in the villages along the main roads, connecting Nishapoor, Sabzevar, Goochan, Turbat Hey-darieh, Bojnoord, and Mashhad, have not at some time visited a city, if only at the time of the great religious festivals, or as part of a 'spontaneous demonstration' of national feeling organised by the 'Iran Novin' party[10], for which the army's large trucks provide return transport. So in many villages several people have a member of the family, or a friend, already living at least part of the year in the nearest town.

The coming of land reform has generally had a beneficial effect in regions such as the north of Khorasan. The re-distribution ofincome due to the abolition of the landowners' share (upto three-fifths of the total product) has raised incomes locally, and perhaps more importantly has stimulated the villagers into demanding more - visiting the town, and lobbying the Agricultural Department and Land Reform Office, to make their desires known. All of these areinfluences making the transition from village to city life much less of a necessity, or a measure of desperation - and consequently more attractive and easy to accomplish.

Yet cases of real hardship are still common. Many villages, neglected in the past by the landlord, find it difficult to raise capital, and there are still a minority who are landless, dependent on day-labour for their subsistence. Yet even for these, opportunities in the north are greater. The sugar-beet factories, for example, are a large seasonal employer of unskilled labour which sign on hundreds of workers from October

to March each year, many of whom, however, in the summer months of low agricultural activity, find their way to the city where they swell the ranks of the unemployed, living in the street or the disused caravanserai, trying to find work.

Migration from one rural area to another may be a partial explanation of those few areas on the map which have a net increase by migration. Examples were encountered of landlords moving peasant families out of certain marginally productive areas south of Nishapoor to others of their villages in the Mashhad area, to help in melon, fruit, sugar-beet or vegetable farming on the fields and in the gardens of the owner (left intact by land reform) to their mutual benefit. The landlords' increasingly precise knowledge of their economic situation in cash terms is forcing decisions of efficiency to be made - and migration sometimes is a by-product of this process.

Thus in many areas of the north, 'pull' factors must largely be regarded as being more significant than 'push' factors in the generation of urbanward migration, a situation whose antithesis is to be found in the desert margins of the south. In the north the in-migrant tends to be the more ambitious, enterprising, and possibly the semi-literate members of his community, who makes a choice to go. In the south, it is the poorest, the most entrenched and least adaptable, the illiterate, who must go, possibly against his will.

5. THE STRUCTURE OF IN-MIGRATION IN THE CITY OF MASHHAD

This analysis proceeded along the lines already developed in earlier sections. The data for the 5% Household Survey were used, and refer to only those persons, of all ages, who had, in November 1963, stayed in Mashhad less than 10 years. They include all the children of those persons, whether born in or outside Mashhad. This is to be known as the 'recently in-migrant population', forming a part of the total number of persons in-migrant to Mashhad during their lifetime, but much more easy to trace than the total.

A. Method

Two maps were constructed from the data - Fig.26, the proportion of the population 'recently' in-migrant in the 29 zones, and Fig.27, the distribution by origin of the 'recently' in-migrant population of the 29 zones.

(i) In each case sampling errors were first calculated by the method used previously and described in Appendix B,1. The maximum errors were in the first case (Fig.26) +/-2.62% exceeded by zone 26 which was therefore excluded and in the second case (Fig.27) errors were all below 4.38% except for zones 10, 21 and 26, in which they attained 20% and so these latter zones were excluded from the map of distribution by origin of the 'recently' in-migrant population.

(ii) The chi-squared test was used in both cases to verify that the sample frequencies observed were deviant enough from the null hypothesis of

proportional distribution not to have arisen by chance, or due to accidents in sampling. In the case of Fig.26 (the proportion of the population (recently' in-migrant), it was not possible to test each zone separately, since we are dealing with only one variable, and so the city was tested as a whole at 28 degrees of freedom and the contribution made by each zone to this total chi-squared value was noted in each case (Appendix A, table 10). This technique is identical to that used in the analysis of literacy, in chapter 8 and described in Appendix B,2(a). Those zones contributing most to the total value (Classes A. and B) are the ones on which attention is subsequently concentrated, whilst those contributing less than 1.10% are ignored (Class C). The total value for the city is 1196.8 which represents a probability of less than .001 that the distribution could have occurred by chance.

(iii) In the second case, Fig.27 - the analysis of the origin of the in-migrants, zone by zone - a four way matrix was set up based on a classification of the origins into -

(a) urban

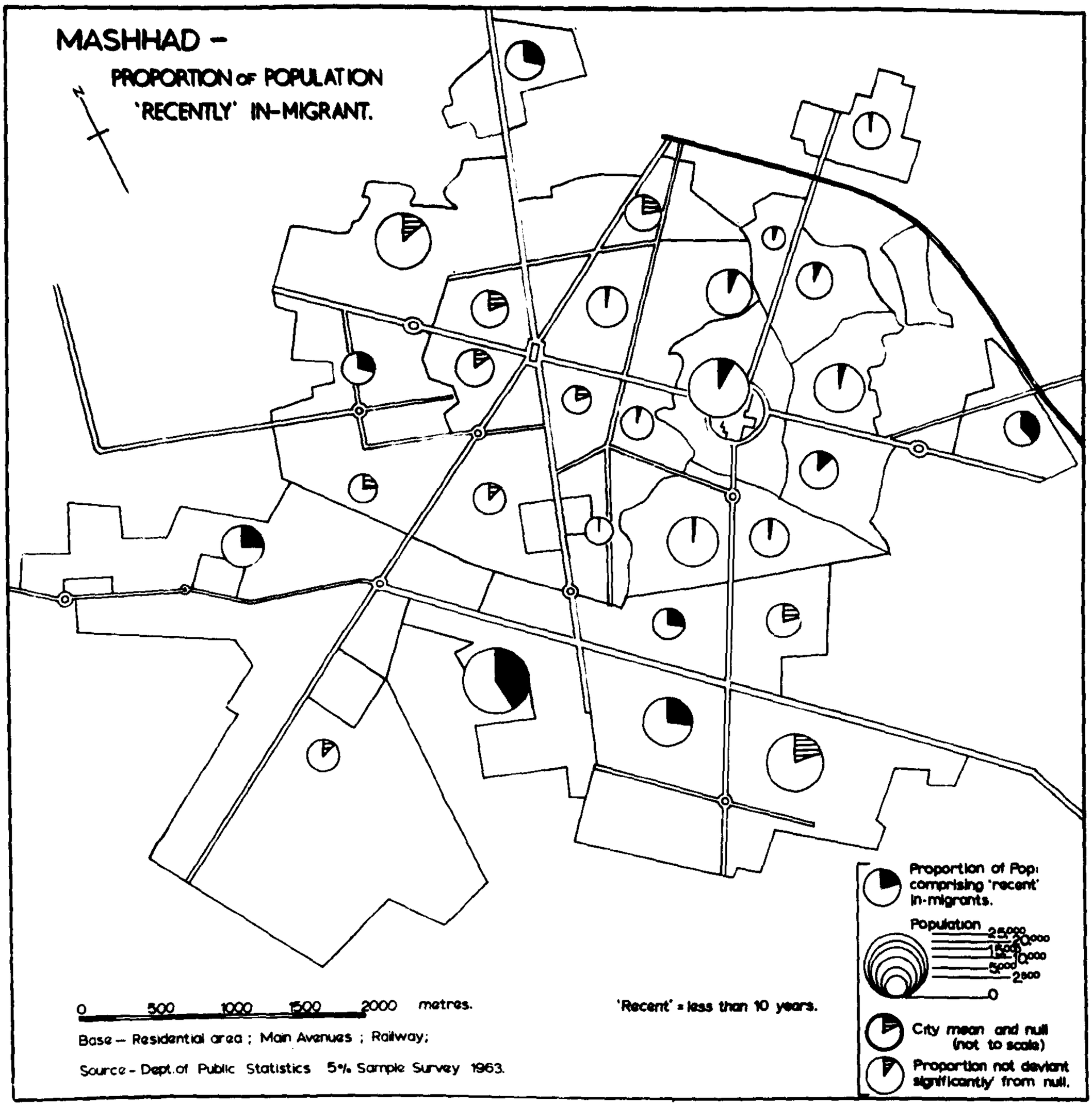
(b) rural

(c) foreign

(d) unknown .

The first three yield a 3 x 2 contingency table for each zone of the city. However, it was found that even with the use of Yates' Correction Factor for small numbers, (Appendix B,2(c)), the sample of foreign-born persons was too small, and so this was excluded from the analysis. This

Fig. 26.


MASHHAD –
PROPORTION OF POPULATION
'RECENTLY' IN-MIGRANT.
N
Proportion of Pop: comprising 'recent' in-migrants.
Population
25,000
20,000
15,000
10,000
5,000
2,500
0
City mean and null (not to scale)
Proportion not deviant significantly from null.
0 500 1000 1500 2000 metres.
'Recent' = less than 10 years.
Base – Residential area ; Main Avenues ; Railway;
Source - Dept. of Public Statistics 5% Sample Survey 1963.

left a 2 x 2 contingency table for the zones which were each tested by chi-squared to determine whether the differences between them could have arisen by chance or whether they are large enough to be considered significant. The results (Appendix A. table 11) indicate that the city as a whole considered as a 2 x 26 table (three zones, it will be remembered, were excluded due to excessively large sampling errors) has a chi-squared value of 825.1, which is significant at the .001 level of probability, making it highly unlikely that the distribution could have occurred by chance. However, four of the individual zones had chi-squared values so low that their values could easily have arisen by chance. Consequently these zones 13, 15, 18 and 22 were eliminated from consideration, which with the addition of zones 10, 21 and 26, in which sampling errors are too large, left a total of 22 zones for the map, Fig.27. By these methods all chance variations and errors of sampling were eliminated before the maps were constructed.

B. Evaluation of the maps (Figs. 26 and 27)

(i) Fig.26. Proportion of Population Recently In-Migrant

As Appendix A, table 10 indicates, of the 29 apparently different zones, only 18 contribute sufficiently to the total chi-squared value to be considered significant. This leaves quite clearly two main regions of the city with respectively a smaller and a larger than proportionate number of recent in-migrants than their total populations would lead one to expect.

Almost all the significant negative deviations occur within the walls of the old town. Zones 5,8,7,10,12,13,14,21,23 and 25, grouped around the Harram, are the older established zones of the city, zone 11 in the north,

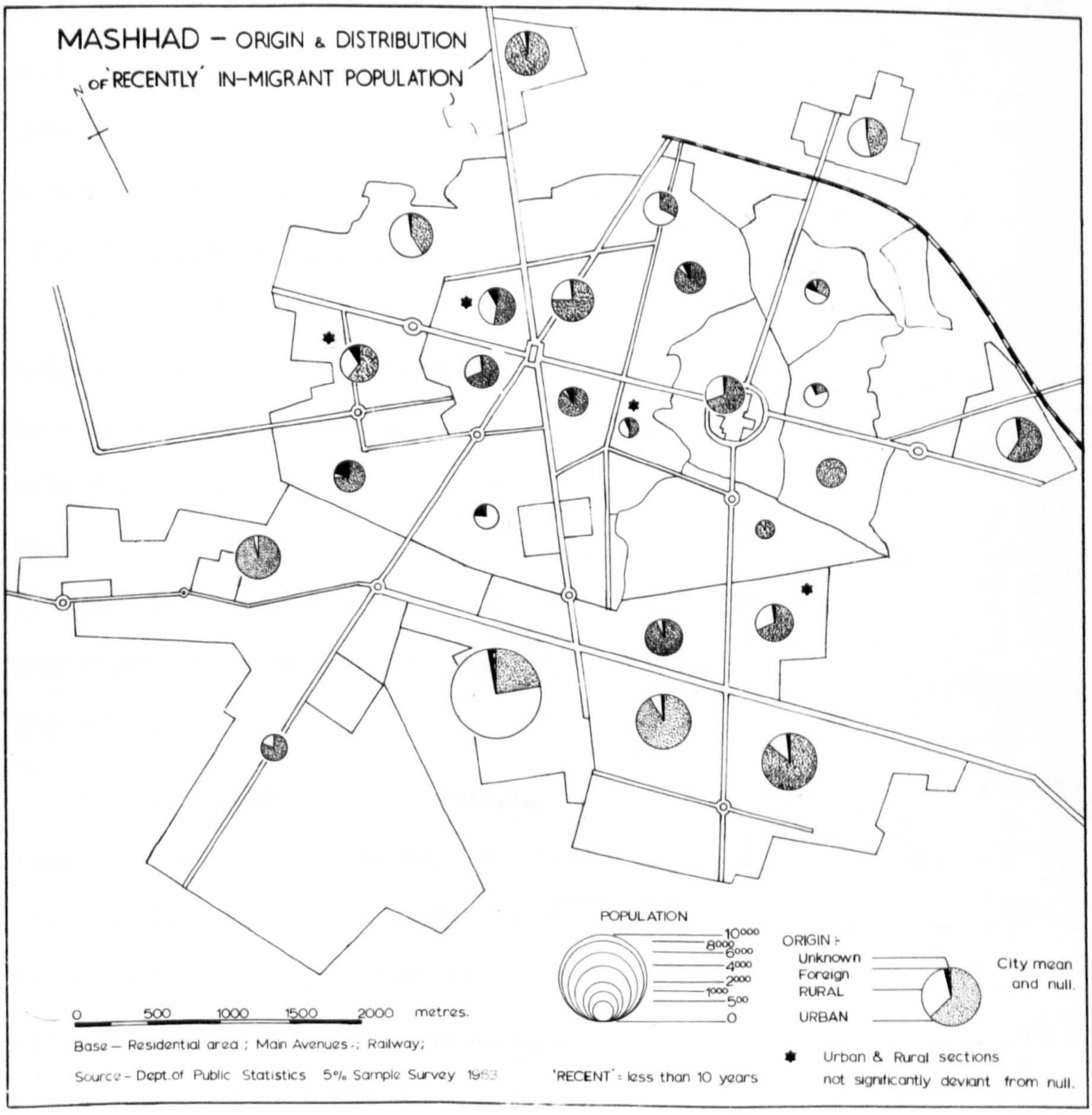
is the only exception.

Opposed to this are zones 2,3 and 29 in the south, 1 and 15 in the west, 16 in the north, and in the east 24, all peripheral locations including most of the recently built housing as well as a great range of socio-economic status, and all with a larger proportion of recent in-migrants than might be expected.

In detail it is obvious that zone 3 in the south has the greatest positive deviation, and indeed it 'explains' 34.0% of the total chi-squared value for the city. This is however simply due to the fact that many army personnel are housed here, near the barracks, and since it is normal government policy to direct its servicemen into places other than those of their birth (to avoid, in the event of riot local soldiers being ordered to fire on their kinsmen)then a large proportion of the population appears as recently in-migrant. Other areas, which might, on the basis of the distribution, be expected to have positive deviations from the null, such as regions 17,20,19 and 6, do not have them.

A generalisation based on this distribution might be that for the household population with which the survey is concerned it is in peripheral zones of recent development that most of the recent in-migrants are housed. This implies that the well-established migrants are able to obtain housing only in newly developed areas of the city - and in fact must build their own houses in these areas, where land is available for renting from the shrine

Fig. 27.


MASHHAD – ORIGIN & DISTRIBUTION
OF 'RECENTLY' IN-MIGRANT POPULATION
N
0 500 1000 1500 2000 metres.
Base – Residential area ; Main Avenues ; Railway;
Source – Dept. of Public Statistics 5% Sample Survey 1963
POPULATION
10000
8000
6000
4000
2000
1000
500
0
'RECENT' = less than 10 years
ORIGIN :-
Unknown
Foreign
RURAL
URBAN
City mean and null.
Urban & Rural sections not significantly deviant from null.

or the municipality, which lays down the main grid-iron plan of the streets. In contrast are the central areas of the city, having few of these established recent in-migrants, since housing is scarce, particularly as central functions replace the residential function. Thus as the city grows, the in-migrants in housholds are added not to the centre of the city, but to its periphery.

(ii) Fig.27. Distribution by origin of the recently in-migrant population

Perhaps the most important fact emerging from this data is, as indicated in Appendix A Table 11, that 63.09% (+/-.93%) of the recently in-migrant population come from other urban areas of Iran, and that only 34.26% (+/-.92%) are from rural areas. Here is an indication that at the level of migration considered by the survey (well-established in-migrants in households), the area is experiencing not rural-urban migration, but, largely, urban-urban migration, probably small town to big town.

The chi-squared test showed that for 24 out of the 29 zones (excepting numbers 10 and 21, for which sample data were too small), and for the city as a whole, there are real differences in the structure of the in-migrating population, by origin. However, whilst the distribution is clearly not wholly random, as the test shows, it is difficult to discern any established patterns in the map. Moreover, attempted correlations between the proportion either urban or rural in origin, proportional size of the in-migrating population, and the old town-new town polarity commonly observed, yielded no conclusive results. Some

associations are evident however, and will be discussed later in this section. It is interesting to note that zone 3, with its large number of army personnel, probably represents a fair sample by origin of recent in-migrants (assuming that drafting is random) - and this is much more 'conventionally' distributed - urban 22.6% rural 76.0%, of the total population. In the army area, we are not necessarily dealing with the second stage, established type of migration, since there is no choice in the decision to move. Zones 4, 15 and 20, it should be noted, have most of the foreign-born in-migrants living in the city.

(iii) Fig.28 (A.B.C.D.) Recent internal migration within the city.

At the beginning of this section, it was shown that the chief form of migration to Mashhad is rural-urban, and this was analysed in some detail. Fig.27, as we have seen, considering a special part of the recently in-migrant population, shows that for the in-migrants established in households:-

(i) Their origin is 63% from urban areas

(ii) Their distribution in the city is very markedly peripheral

This type of migration, can for convenience, be labelled 'second stage in-migration' - it is a movement of the already well-connected, probably (as seen in the section on age-sex relationship) with a fairly evenly balanced sex ratio, and possibly via another part of the city, representing an advanced stage in the in-migration process.

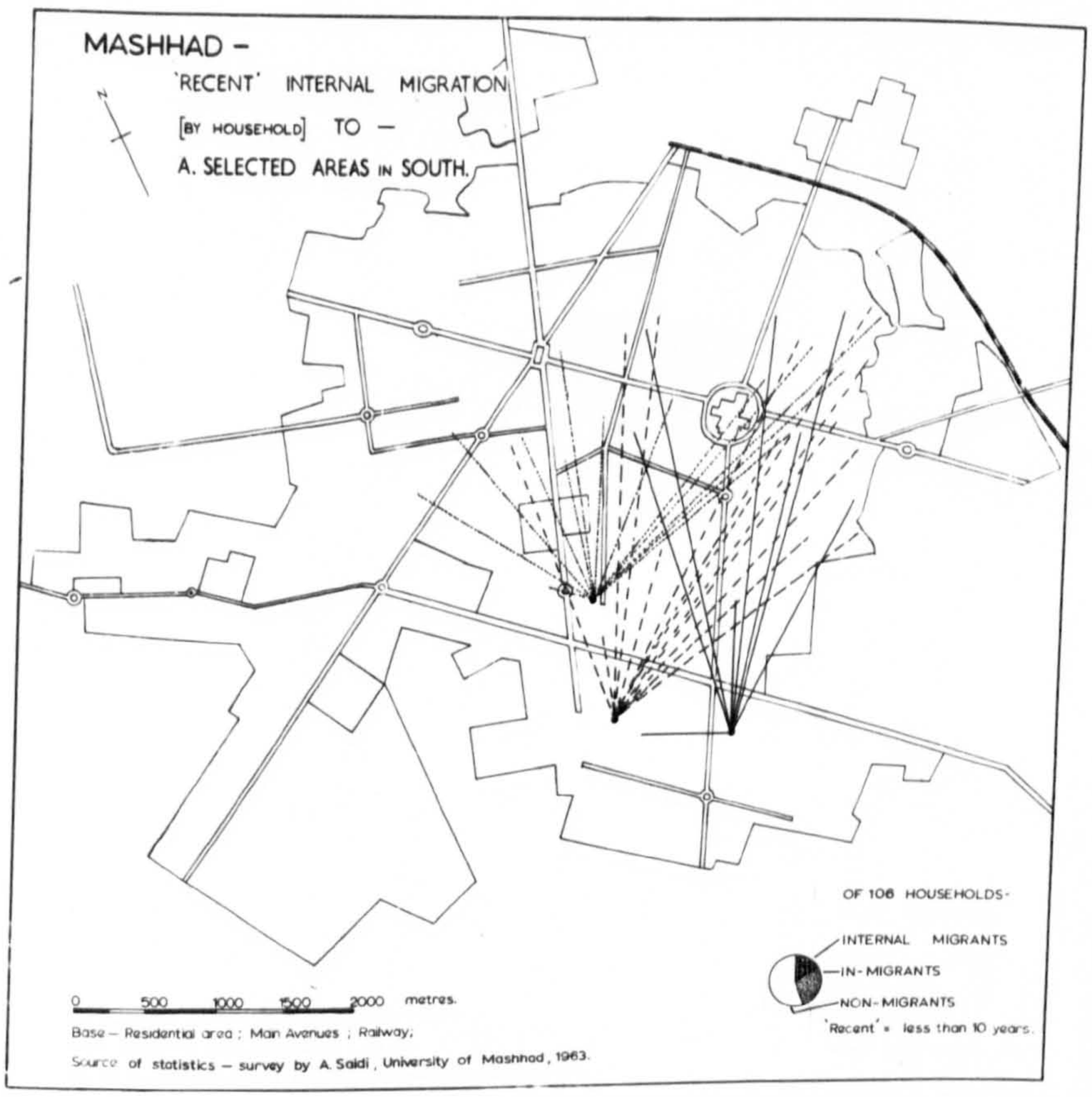


Fig. 28 A.

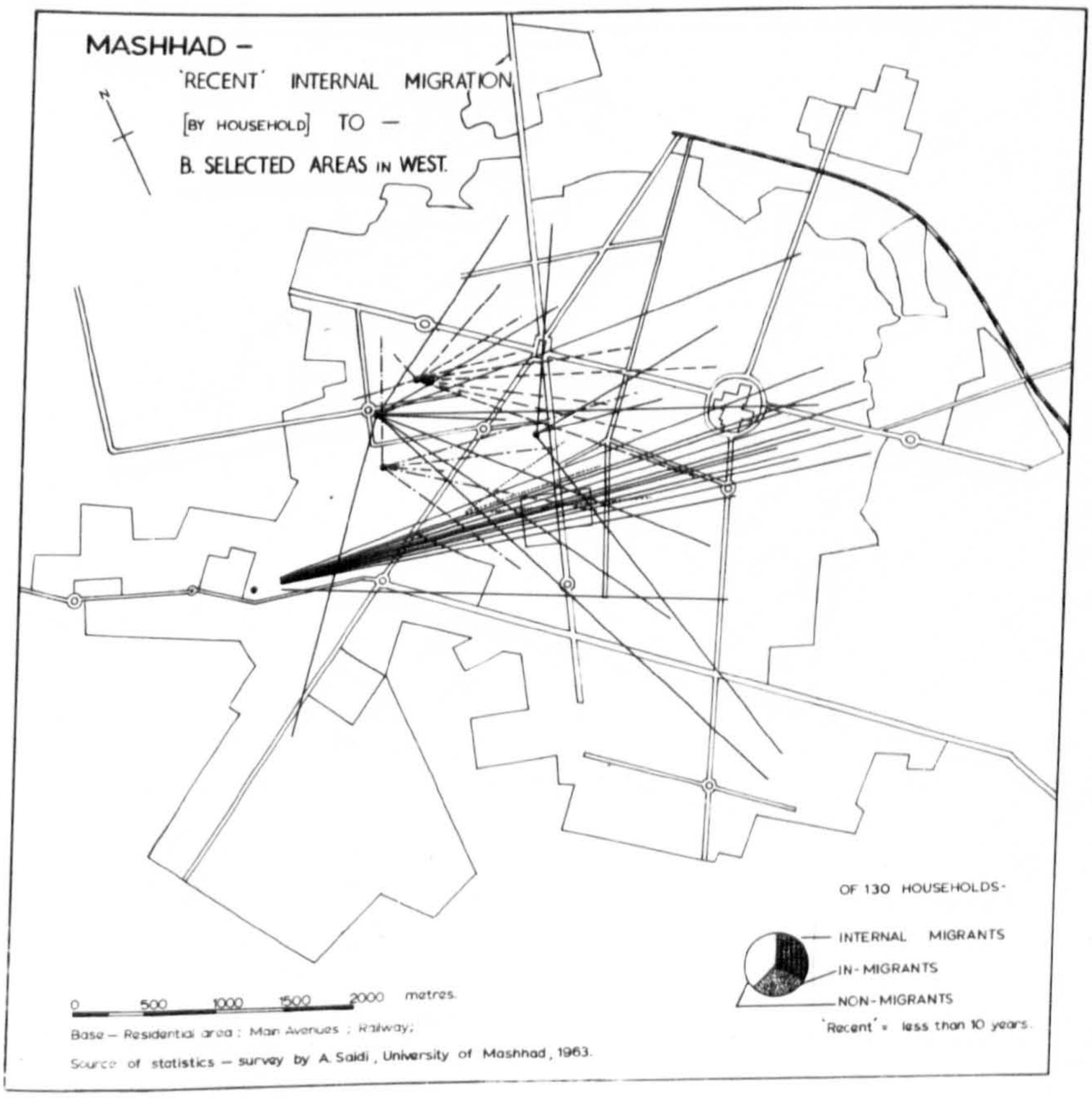


Fig. 28 B.

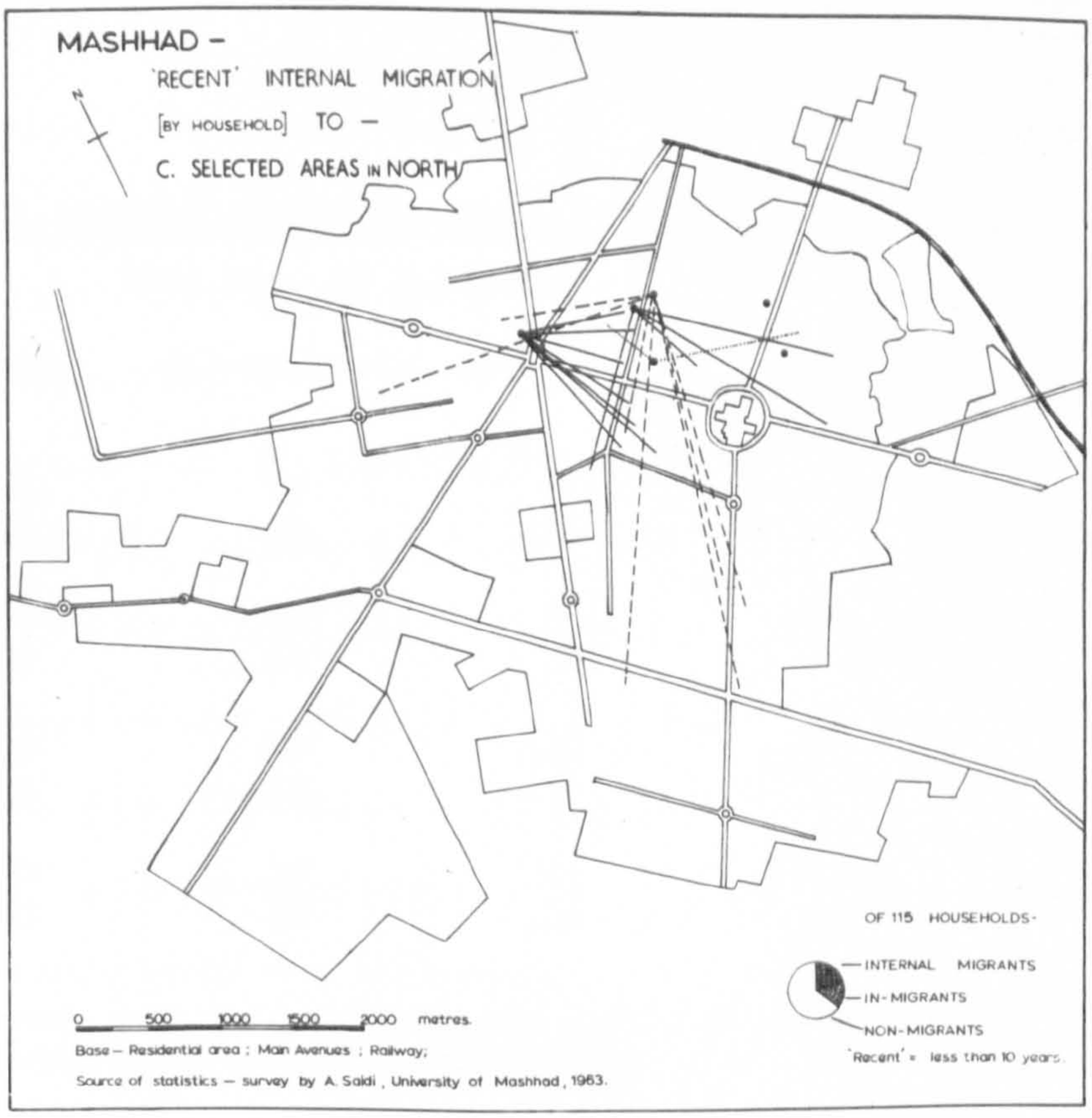


Fig. 28 C.

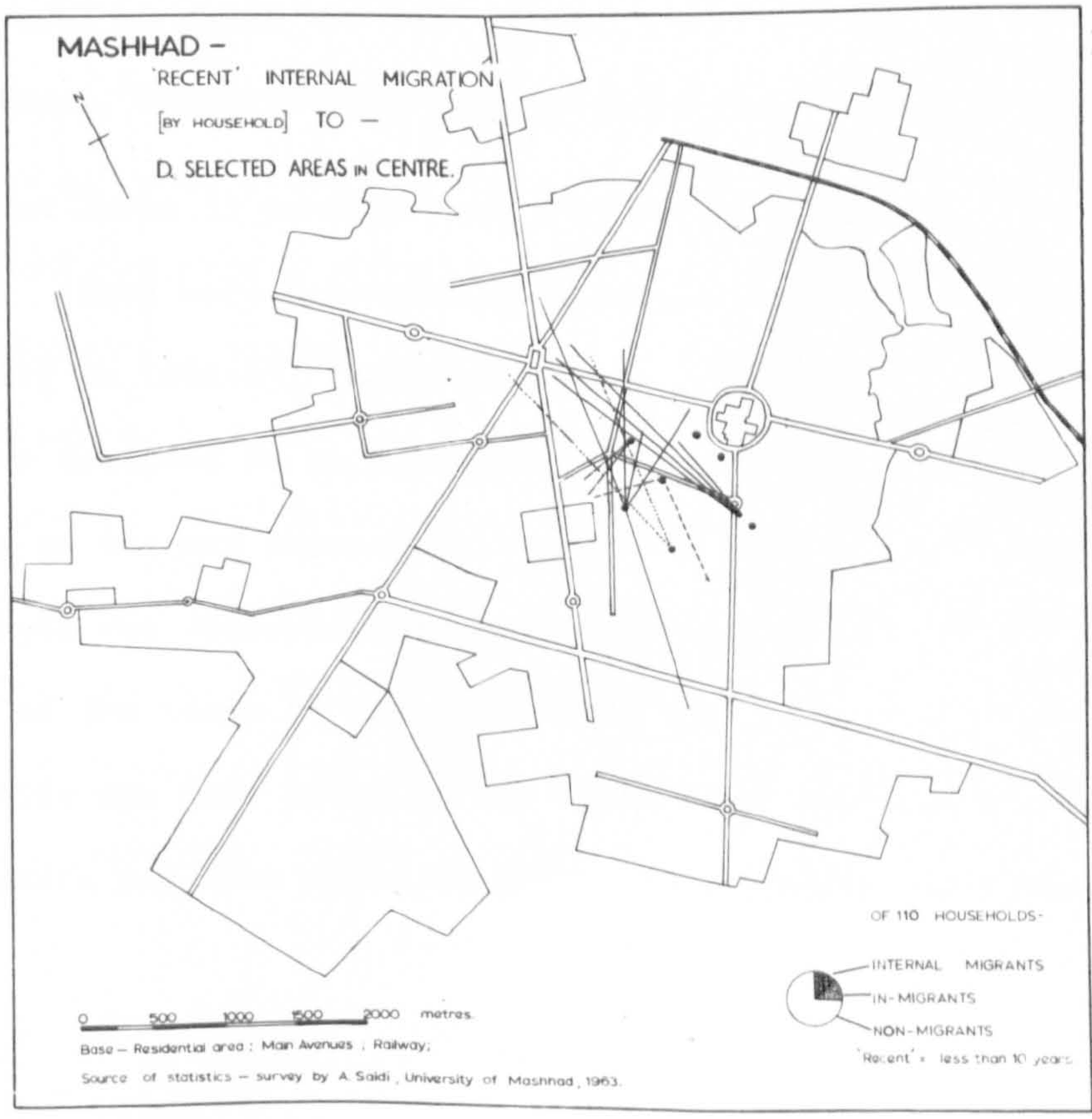


Fig. 28 D.

Table 33

MASHHAD, INTERNAL MIGRATION* BY HOUSEHOLD. SELECTED AREAS, 1963

(See Fig. 28 A.B.C.D.)

Area		Total	All-migrants	In-migrants	Internal Migrants	Non-migrants
A South	No.	106	47	11	36	59
	%	100	44	10	34	56
B West	No.	130	81	39	42	49
	%	100	62	30	32	38
C North	No.	115	40	20	20	75
	%	100	35	17	18	65
D Central	No.	110	29	15	14	81
	%	100	26	14	12	74

N.B. The in-migrant, and internal migrant groups are not mutually exclusive, some households fall into both categories

* In the previous 10 years

Source. Pilot Survey, University of Mashhad Geography Department 1963.

Figure 28 and Table 33 provide some further evidence, if only of heuristic value. They were constructed from data collected in the pilot survey of the city in 1962-63, (Appendix C,2). It is not a sample survey and was in no way designed to be representative of the total population. Each of the dots on the map represents a block of 20 - 30 households, whose last place of abode was determined [redacted] by students of the University. The termination of the lines on the maps shows the position of the last abode of these households who have moved to the block from other parts of the city, and the distribution has been split into four maps merely for reasons of

cartographic clarity. The circle represents the total number of families interviewed, and is divided up on the following basis:-

(1) The area left white represents those households which had not moved in the previous ten years.

(2) The in-migrant families are then divided into two parts, not mutually exclusive. The line shading labelled 'internal migrants' represents that proportion of the total households whose last move was from elsewhere in the city to these blocks. These households may or may not have also been in the last ten years 'in-migrants', from places outside the city - this was not formulated in the questionnaire.

(3) The dotted shading represents that proportion of the total whose last move was direct to these blocks from outside the city - 'in-migrants'. An inspection of the maps and the table suggest the following points.

(i) Considering Map A(Fig.28) of the southern areas, an older part of the suburban extension of zones 2 and 19, about 44% of the households had migrated here in the previous ten years, and over two-thirds of these (34% of the total) were 'internal' migrants, leaving only 10% of the total or about one third of the migrating population who had in-migrated directly from outside the town. Much of the movement is then, from the north-east, and central parts of the old town, indicated by the lines on the map, and it is clear (though data are not available) that many of the households here are 'second stage in-migrants' of recent vintage, whose origins lie outside Mashhad. These people have probably gone through an earlier stage, perhaps of temporary in-migration,

living in the caravanserai and lodging houses of the centre and north-east or with families already established there. Some of them, on the other hand, are probably urban and 'Mashhadi' by origin, their move representing in its centrifugal direction, displacement of central residential areas by other commercial functions, able to pay the higher rents and utilise the crowded conditions.

(ii) The western area (Map B) has a slightly different structure, for here, about 62% of the households are recently in-migrant , but this is split roughly equally (30% and 32% of the total respectively) between 'internal' migrants, and true 'in-migrants' coming direct from outside Mashhad. The findings of Fig.27 are here corroborated, since it is in zones 1,15 and 20, that a high proportion of the in-migrants were seen to have urban or foreign origins - in general a higher socio-economic group who can afford good housing, and thus immediately adopt 'second stage' migration patterns. The high proportion of in-migrants who are rural recorded in zone 20, (Fig.27) is at least partially due to the large 'absentee' landowning element coming into the city (particularly as land reform develops). That part of the migrant parametre coming from other parts of Mashhad clearly has its 'second stage' origin in similar areas of the city to the households recorded in Fig.28A/that is, the north-east and central parts of the old town. One can postulate a similar history of migration, with the qualification that the households of the west are of higher socio-economic status.

(iii) The northern area (Map C.Fig.28) has, yet again, a different structure. First of all the volume of in-migration, both absolutely, as seen earlier in Fig.26 and relatively, is much less than in the south or west. Here in the north only 35% of the households interviewed had moved in the last ten years, and this was divided about equally, as in the west, between true in-migrants (17%) and internal migrants (18%). Here the low numbers correlate well with the negative deviations of Fig.26. Moreover, over half the 35% are in the westernmost block of the map, whilst the two blocks to the east had had no in-migrants in the last ten years - and in fact some of the families, as is proudly pointed out, have been established here over 200 years - truly urban in origin. These two blocks are in fact in zone 5, which in many of the maps drawn has emerged as a higher class area of the old town, where richer, more literate families continue to live, similar to the situation Sjoberg observes in his 'pre-industrial' towns[11]. In many ways, these merchant families retain the older value systems, and are not by any means in contact with the non-established, predominantly male first stage in-migrants living in caravanserai and lodging houses of the area, some of whom later move to the south or west of the city, as seen. These richer families of long establishment still remaining in the centre obviously prefer the locational centrality and cramped conditions of the old town , unlike their erstwhile neighbours with their preferences for greater living space, who move to the suburbs and whose old houses are quickly converted into hotels, lodging houses, and multi-family dwellings as they leave them.

(iv) The final map D (Fig.28) deals with the situation in the centre. Here again, two blocks (those within the bazar) have had no households in-migrating in the last ten years - on the contrary, most of the population has moved out, succumbing to centrifugal pressures, as central functions take over. Few of the big houses still remain as residences, the majority having been converted long ago into lodging houses, or shops and storage areas. Despite the fact that these two blocks have not been included in the percentage calculation, due to lack of accuracy in the data, only 26% of the total households interviewed had moved within the previous ten years, split into true in-migrants 14%, and internal migrants, 12%. This low figure is not unexpected here, since a high one would imply movements of families from the periphery to the centre. What is remarkable is that the figure is not lower. This is a result of two types of functional change now taking place within this, the central area :-

(i) In the bazar area, land values rise each year, the pilgrim trade expands, and the residential function declines - families move out.

(ii) South of this, however, two once important bazars, Bazar Sarshur, and Kutche Arg (connecting Arg to Mosque), have declined, and continue to decline in commercial importance, due to the revolution in land values and access brought about by Reza Shah's great avenues - they have become commercial backwaters, and dereliction and disuse are common. (Plate 14)

However many of the commercial premises in Kutche Arg and Bazar Sarshur, are being bought up cheaply and converted (by wealthier families) into residences - which 'explains' the fact that some centrapetal internal movements are taking place, recorded as the 26% above. This extremely interesting situation is then at least partially a product of changing land-use functions, as the city expands.

The eastern part of the city is not represented in this series of maps, since it was not possible to conduct interviews in it. However, its northern and central parts can be assumed to be similar in structure to the north-eastern region of the city (Fig.28.C.) - a region of stability at the household level, with some outward movement to the suburbs, and significant numbers of first stage in-migrants living in its caravanserai. The southern part of this eastern edge is a 'suburban' area, similar to zone 24, predominantly an area of in-migration, with some internal migration housing families displaced from the centre.

Thus migration within the city is chiefly centrifugal in nature, with some qualifications already noted. The periphery receives both in-migrants direct from outside the city, and households known here as 'internal' migrants (many of whom were at an earlier stage in-migrant) displaced from the centre by central pressures, who are searching for housing in these outer areas. The centre of the city, whilst probably forming a temporary home for earlier first stage in-migrants, who presumably go through

the process of adaptation whilst living in it, is thus mainly an area of out-migration of households to the periphery. Differences between parts of the periphery in terms of the types of migrant household received, and in total and proportional amounts, are also clear from the map.

6. SUMMARY AND CONCLUSION

The situation in Iran in terms of urban in-migration is reviewed by the use of population change data and compared to that of India, indicating that 17.26% of Iran's urban population in 1963 had in-migrated during the previous ten years. A comparable figure for India in 1951 was 15%. Comparisons between Mashhad and other cities indicate that despite its nature Mashhad is not growing by in-migration any faster than the others. However, Khorasan, unlike the other provinces, was losing population at a rate, in rural areas of between -2.78% and-4.63% per annum, 1956-63. Consideration of population change data for rural Khorasan (Fig.25) leads us to observe that 'push' factors are most dominant in the sub-marginal south, 'pull' factors being clearly most important in the more prosperous, less remote northern areas of the province, which are losing population less quickly. Due to this, it is probably true to say that in-migrants from the south tend to be those least fitted for the process of migration and adaptation, in which they have little choice, whilst those from the north are the more able and enterprising, moving by choice and often with prior knowledge, at first or second hand, of the city.

Some attempt at analysis of the structure of in-migration in the city of Mashhad was made (Fig.26). Conclusions here are that it is in the peripheral areas of recent development that the majority of those in-migrants living in households are now located, the central areas of the old town having very few of this type. By origin (Fig.27) this household-dwelling in-migrant population is 63% from other urban areas of Iran, though its distribution by origin within the city seems to have few significant correlations.

Finally the series of maps (Fig.28) of movement within the city indicate dominantly centrifugal migration, with some exceptions, whilst the distribution of in-migrants as opposed to 'internal migrants' is noted.

Drawing a final, tentative conclusion from this information, we see that migration to Mashhad would seem to be in two stages. First stage in-migration, that of non-established migrants, is from rural areas outside the city to central areas of the old town, probably of split-family nature, and with a sex ratio dominated by males. These migrants exist in a more or less temporary fashion in the caravanserai, lodging houses, and perhaps the homes of others, in the city (old town) centre. Second stage migration, that of well-connected and established households and families, appears to have two patterns - in-migration from other (smaller) urban areas direct to the peripheral areas of this city, in the recently-built suburbs; and a movement of families (who themselves may or may not have experienced earlier first stage in-migration) - from the centre and north-east of the old town, to the periphery. Both first and second stage types appear to be taking place simulataneously.

Notes to text, and references

1. Shahrestan - an administrative unit based on the town (shahr = town)

2. Bogue, D.J. and Zachariah K.C. 'Urbanisation and migration in India', in Turner, R. (ed). 'India's Urban Future'. Univ. of California Press, 1962 p.29.

3. Bogue and Zachariah op.cit. p.31

4. ibid, p.30

5. idem.

6. dehistan - an administrative unit, based on the village, (deh=village)

7. Institute of Malarial Research, Mashhad Branch, unpublished Census of Rural Khorasan

8. Discussion on K.S. MaClachlan's seminar paper 'Land Reform in Iran' School of Oriental and African Studies, London, 1965. To be published.

9. ibid.

10. A 'peoples' party' formed by the late Mr. Ali-Mansour, Prime Minister of Iran, assassinated Feb.1965, to popularise government policies, particularly over land reform.

11. Sjoberg, G.S. 'The pre-industrial city - Past and Present' Glencoe Ill. U.S.A, 1960. p.91-97

12. INCOME AND EXPENDITURE

1. Introduction

2. Comparisons

3. The frequency distribution of incomes and expenditure

4. The structure of consumption expenditures- I. Analysis of Variance

   (a) method

   (b) the general structure of expenditures

   (c) the structure of expenditure on food items .

5. The structure of consumption expenditures - 2. Difference in structure at various levels of income/expenditure.

   (a) method

   (b) the general structure of expenditure

   (c)the structure of expenditure on food items .

6. Other work on expenditure elasticities

7. The geographical distribution of income and expenditure in Mashhad

8. Summary and Conclusion

9. Summary of Part 2.

1. Introduction

The distribution of income, and the variations in the structure of expenditures at points along the scale of income is the final aspect of the urban population to be considered here. As earlier hypothesised it is possibly the variations in the spatial distribution of the two factors, income and expenditure, that influence to some extent the commercial and land-use structure of the city, particularly its central areas.

Throughout this section, the data used are those (published and unpublished) collected by the Bank Markazi, Iran, in its survey of Consumer Expenditure and Income in Urban Iran 1959-1960. However, where possible, income is measured in terms of total expenditure, since the data on income are (as indicated in the Bank's reports) inaccurate and usually under-reported. In general the great difficulty of collecting data of income and expenditure in a largely illiterate community implies that levels of accuracy may not be high, though the sample is thought to be a fair representation of Urban Iran.

2. Comparisons

Whilst income levels in Urban Iran are only low, they are probably much higher than those of Rural Iran,[1] and are not to be taken as representative of Iran as a whole. The international comparisons presented in Table 34 indicate Iran's position in the world in terms of per capita wealth, but within the table comparability varies a good deal, due to the different definitions used in the collection of national statistics. Urban Iran (income per capita 179 dollars) appears lowest on the list though this is at

Table 34

INCOME AND EXPENDITURE, PER CAPITA, PER ANNUM, SELECTED NATIONS,

Data 1952-53, except where indicated.

Income per capita per annum (dollars)

IRAN (urban)[1]	180(1959-1960)
Turkey	210
Mexico	220
Brazil	230
Italy	310
Austria	370
Ireland	410
West Germany	510
Norway	740
U.K.	780
Sweden	950
New Zealand	1000

Expenditure per capita per annum (dollars)

Iraq (urban)[2]	127	1954
U.A.R.[2]	149	1958-9
Japan (urban)	176	1960
IRAN (urban)[2]	229	1959-60
Sweden[2]	825	1958
Canada[2]	1023	1955

Source - Estimates of U.N. Statistical Yearbook 1962. (Data 1952-3)

Except 1. Bank Markazi, Iran, 1962 (Data 1959-60)

2. I.L.O.Yearbook of Statistics 1962 (Data as in table)

least partially due to under-reporting. Expenditure per capita (229 dollars per annum) is a more realistic figure which compares favourably with 127 dollars p.a. for Urban Iraq, and 176 dollars p.a. for Urban Japan. Brazil, Turkey, Mexico, and the U.A.R. are also roughly in the same grouping as Urban Iran, though their per capita incomes are probably much greater than that of the total population of Iran. In general these poorer nations have per capita income less than one third those of advanced European nations, and they tend to have features such as maldistribution of income and characteristic expenditure patterns in common.

Table 35

COMPARISONS OF PROPORTION OF EXPENDITURE DEVOTED TO MAJOR TYPES OF CONSUMPTION

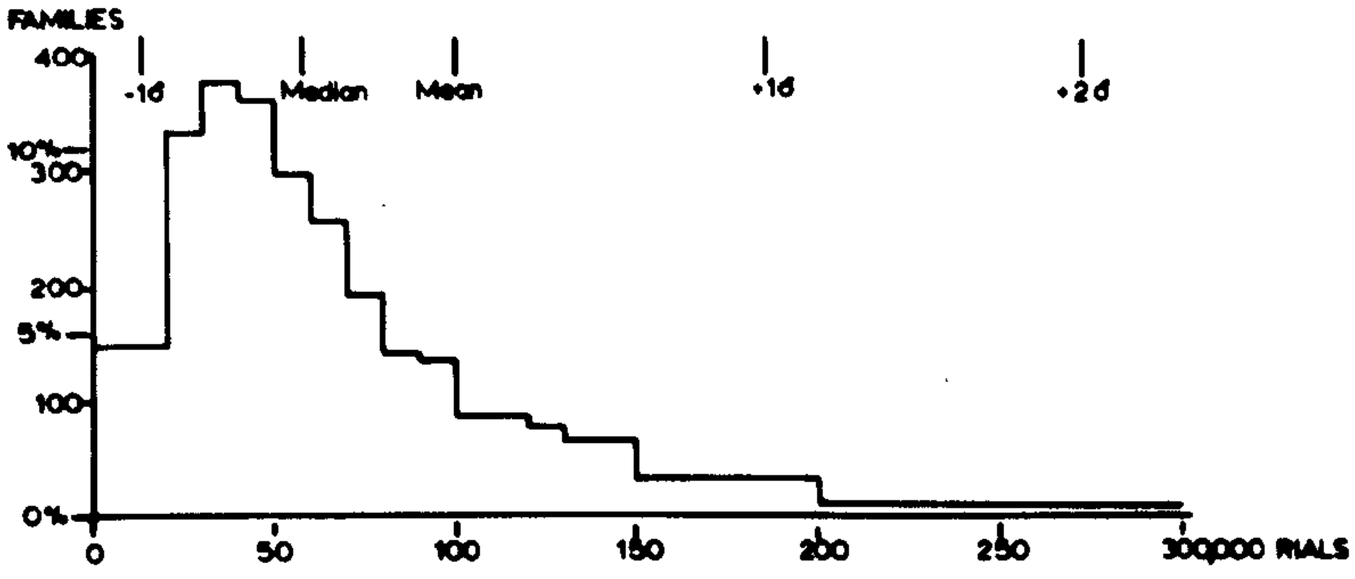
Area	Year	Food	Housing	Clothing	All Other
IRAN (urban)	1959-60	48.7	21.9	10.3	19.9
Tehran	1959-60	40.8	26.4	9.2	24.6
Baghdad	1954	57.4	19.9	7.2	15.5
India (urban)	1955	58.3	10.5	7.3	24.0
Karachi	1955-56	55.9	11.3	10.9	21.9
Damascus	1957-58	41.0	30.0	12.0	17.0
Israel (workers)	1956-57	46.6	12.6	13.8	27.0
U.S.A. (urban)	1950	30.8	23.5	10.5	35.2

Source - Bank Markazi op.cit. 1959-60

Table 35 indicates that families in the urban areas of the Middle East spend the greatest part of their income on food, and much smaller proportions on

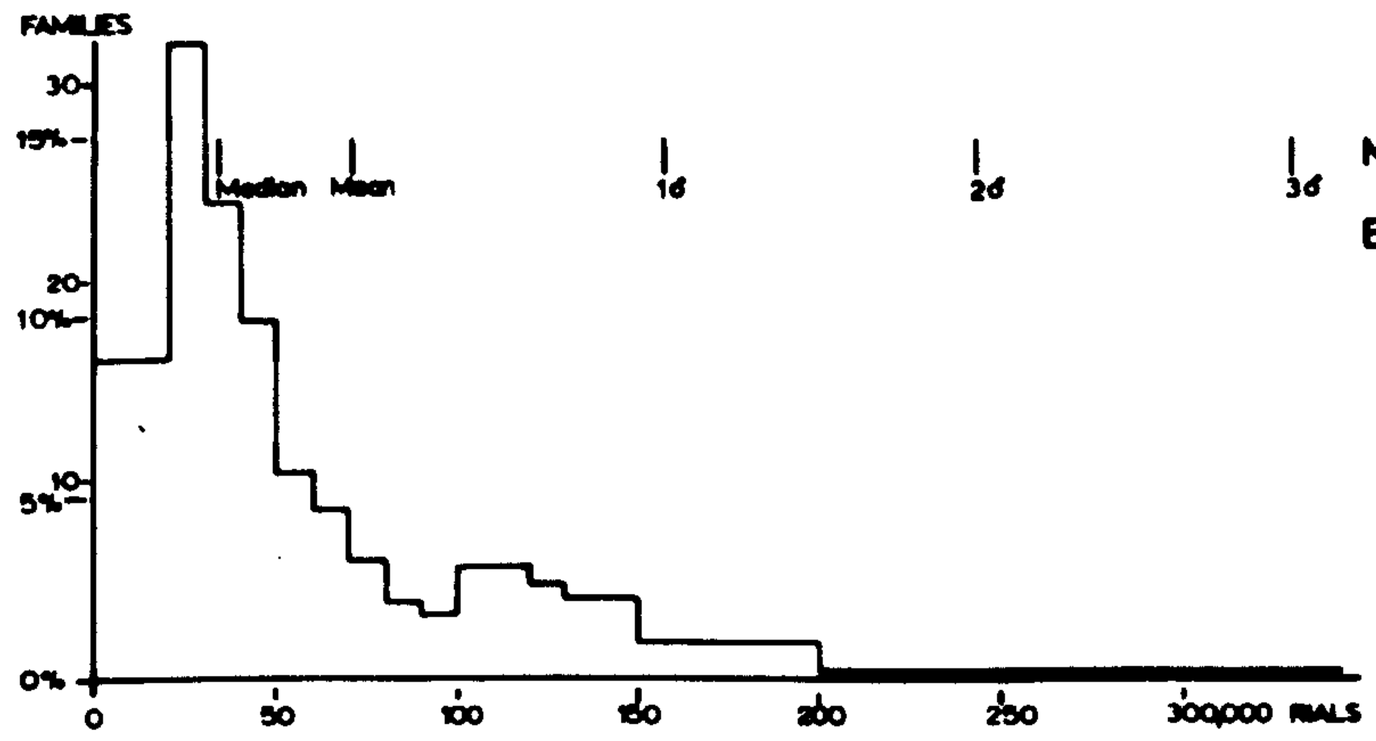
Fig. 29.

A.



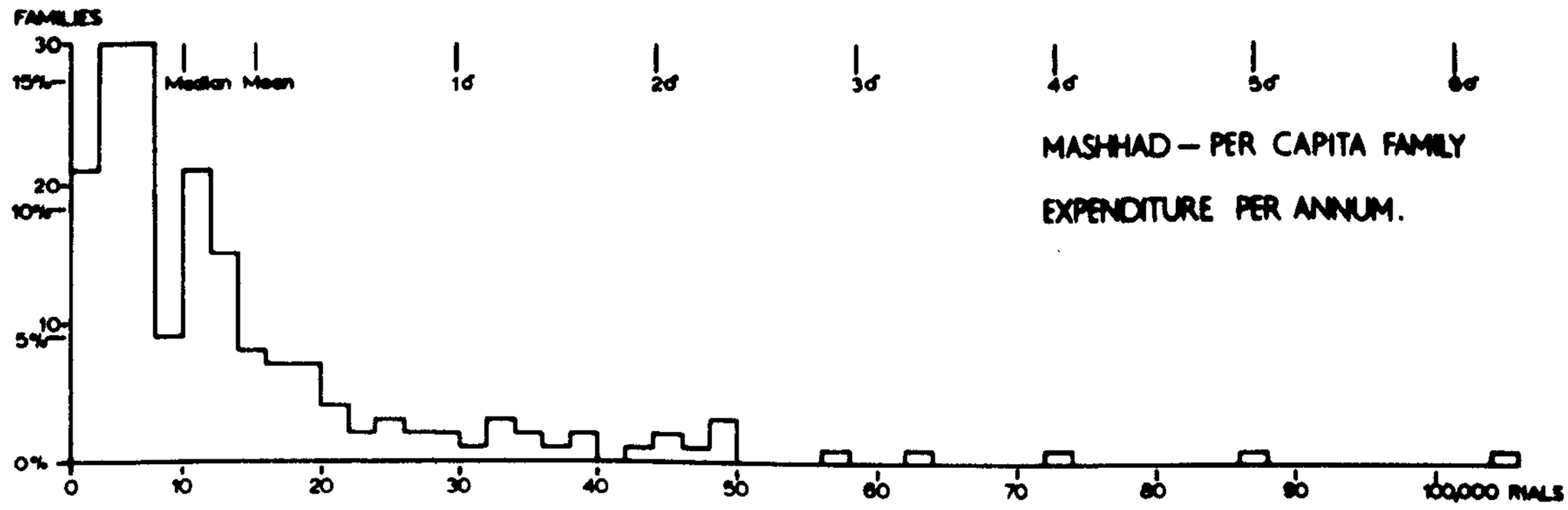
URBAN IRAN - FAMILY EXPENDITURE PER ANNUM.

B.



MASHHAD – FAMILY EXPENDITURE PER ANNUM.

C.



MASHHAD – PER CAPITA FAMILY EXPENDITURE PER ANNUM.

SOURCE OF DATA – BANK MARKAZI SURVEY 1959-1960.

housing, clothing, or other items. Their incomes are so low that satisfaction of the most basic need, food, tends to absorb about half of the total, whereas the figure is nearer one third in Europe and America. The figures for Iran are not wholly comparable, since there are many cases, (particularly in urban areas) in which families live rent-free, since houses are provided for some types of government and religious employee.

3. Frequency distribution of Income/Expenditure (Fig.29)

Figure 29 gives the frequency distribution of total family expenditures[2] per annum for Urban Iran and Mashhad, and also, for the latter, the distribution of per capita family expenditure. These histograms have in common a highly skewed distribution with the majority of families occupying the lowest expenditure classes balanced by a very few 'rich' at the upper end of the scale[3]. Urban Iran (Fig.29.A.) has a mean family expenditure of 85,375 rials per annum (1127 dollars), but the standard deviation of 87,316 rials p.a. is 102.3% of this mean, indicating a wide range of values, and the median occurs at only about 60,000 rials p.a. Whilst 74.6% of the total families in the sample have less than the mean annual expenditure, extremely high values in the distribution attain + 10 standard deviations. The distribution of per annum family expenditures in Mashhad is, however, even more extreme than that of Urban Iran. The mean value is much lower - 71,304 rials (941 dollars)- but the standard deviation of 85,925 rials p.a. is much higher, representing 120.6% of the mean value. The median on the other hand is only about 35,000 rials p.a., and in this case 73.6% of the families have less than the mean expenditure.

The distribution of family per capita expenditure per annum for Mashhad (Fig.29c) is less skewed than the per family distribution for either Urban Iran or Mashhad. The mean is 14,571 rials p.a. (204 dollars) and the standard deviation at 15,252 rials p.a. is 104.7% of the mean (much lower than the figure of 120.6% in the distribution of family expenditures) and 71.2% of the families have a per capita expenditure less than the mean. Detailed data on the distribution of per capita expenditure for Urban Iran are not available, but it is known that the mean is 17,365 rials per annum (229 dollars) and the standard deviation only 12,806 rials p.a. - 73.7% of the mean, which suggests that for Urban Iran the per capita distribution is also less skewed than the per family distribution. This is at least partially due to the negative correlation of -.65 shown to exist (Chap.10) between household size and per capita family expenditure. The wealthier families tend in part to be also the larger ones, thus reducing the skewness of the distribution of expenditure per capita for Urban Iran.

4. <u>The Structure of Consumption Expenditures I. Analysis of Variance</u>.

A. <u>Method</u>

Expenditures were analysed only for Urban Iran, since the Mashhad sample of 182 families is too small to allow such a detailed breakdown. It will however be assumed that the general trends found in the analysis for Urban Iran are applicable for Mashhad, which as seen has roughly a similar distribution of total expenditure. Differences in detail are discussed in the text.

Expenditures were analysed in two matrixes. The first (Table 36) considers for various classes of family total expenditure per annum, the main items making up this total, such as food, rent, clothing, etc. The second (Table 37) is concerned with the distribution of expenditure on various items which together make up the total spent on food, per capita, per week. The classes of table 37 are income groups, since the breakdown of weekly food expenditures was not available for classes of total expenditure. In both cases the item-expenditures have been broken down into per capita values, in order to avoid the difficulties of working with the raw data which were for families of different sizes.

Before any analysis could be carried out, it was felt that the assumption (as yet unstated) that differences in the structure of consumption do exist at various income levels, must be justified. Clearly if the differences observed, presented in tables 36 and 37 in percentage terms, are not significant, then the only valid conclusion to be made is that there is no relationship between the structure of consumption expenditures and the level of income/expenditure. An analysis was therefore made of the variance within the two matrixes (real values of tables 36 and 37) using the mean value in each cell of the tables. The use of mean values in such an analysis can only be justified when, as in this case, the raw data are not available, and no alternative presents itself. Moreover such an analysis must be under rigid assumptions:-

(i) That the values making up the mean in each cell of the matrix are normally distributed.

Table 36

GENERAL STRUCTURE OF CONSUMPTION EXPENDITURES. Percentage distribution of expenditure per capita per annum against family total expenditure groups, per annum, Urban Iran, 1959-60

Family Expenditure per annum (000's Rials)	< 20	20-30	30-40	40-50	50-62.5	62.5-75	75-87.5	87.5-100	100-125	125-150	150-200	>200
1. Food	65.3	63.9	62.6	60.5	58.3	56.2	55.0	54.7	52.0	50.3	46.6	34.1
2. Tobacco	4.7	3.3	2.9	2.9	2.6	2.7	2.1	2.5	1.9	1.5	1.6	1.0
3. Rent and owner costs	3.2	4.1	4.5	5.4	5.9	5.9	5.3	8.5	8.1	9.0	11.7	20.2
4. Running costs and furniture etc.	11.0	10.4	10.2	9.4	10.1	10.4	11.0	10.5	10.3	11.1	11.7	11.1
5. Clothing (females)	3.4	3.5	3.7	3.9	4.1	4.1	4.0	4.0	4.5	4.2	4.5	3.5
6. Clothing (males)	3.8	4.6	4.9	5.6	5.7	5.9	5.7	5.8	5.7	5.7	5.5	4.2
7. Services - personal & medical	5.5	6.6	7.0	7.4	7.4	7.9	8.4	7.3	7.5	7.2	7.4	5.9
8. Recreation and education	0.5	0.6	1.0	1.2	1.7	2.1	2.4	1.9	2.7	2.8	3.0	3.4
9. Travel	0.9	1.4	1.5	1.7	1.7	2.3	2.1	1.7	2.5	3.0	2.8	6.1
10. Contributions and other expenses	1.7	1.6	1.7	2.0	2.5	2.5	4.0	3.1	4.8	5.2	5.2	10.5
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source - Bank Markazi, op.cit. 1959-60.

Table 7

STRUCTURE OF FOOD EXPENDITURES. Percentage distribution of expenditure per capita per week on items of food, against family income groups per annum, Urban Iran 1959-60.

Family income per annum in 000's of rials	< 5	5-10	10-15	15-20	20-25	25-30	30-40	40-50	50-75	75-100	100-150	>150
1. Food and drink consumed outside the home	1.8	3.6	5.6	6.3	6.8	7.7	7.0	6.8	7.1	7.3	8.0	8.4
2. Dairy products	7.6	8.0	6.6	6.1	6.6	6.6	7.0	7.4	7.7	8.6	8.7	9.8
3. Bread and flour	24.3	30.3	30.2	25.6	25.5	21.5	20.8	17.8	15.9	14.0	12.9	9.2
4. Rice	6.4	5.9	4.5	5.4	5.8	5.6	8.2	9.6	9.1	9.8	8.4	7.6
5. Mutton and lamb	8.6	6.2	7.8	9.4	10.1	11.2	10.4	9.9	10.6	10.9	10.5	10.6
6. Poultry	-	-	0.3	0.3	0.5	0.2	0.3	0.6	1.2	1.5	1.6	3.6
7. Beef, Pork, fish	3.0	3.6	4.0	3.2	2.1	1.9	2.1	1.8	1.6	1.6	1.3	1.6
8. Fats and Oils	4.2	10.1	6.0	8.1	7.0	8.8	8.0	8.9	9.6	9.0	9.7	10.3
9. Sugar and sweets	13.1	11.3	11.0	9.7	9.8	9.7	9.3	8.5	7.8	7.2	7.1	5.6
10. Fresh fruit and vegetables	14.9	8.6	11.1	11.1	12.8	12.9	13.5	15.2	15.6	15.5	16.8	19.1
11. Canned and dried fruit, and nuts	1.6	0.8	1.0	1.1	1.1	1.1	0.8	0.9	1.1	1.8	1.2	1.9
12. Pulses and Cereals	3.1	2.8	3.1	4.2	3.4	3.8	3.8	3.3	3.6	4.0	3.0	2.1
13. Tea, coffe, cocoa	8.8	7.1	6.3	7.3	6.3	6.3	6.0	5.6	5.7	4.4	5.4	3.5
14. Other beverages	-	-	0.3	0.4	0.5	0.7	0.9	1.6	1.7	2.3	3.1	4.7
15. Spices and other foods	2.6	1.6	2.2	1.8	1.7	1.9	1.9	2.0	1.7	2.1	2.2	1.9
TOTAL	100.0	99.9	100.0	100.0	100.0	99.9	100.0	99.9	100.0	100.0	99.9	99.9

Source - Bank Markazi op.cit. 1959 - 60

(ii) That each mean is an adequate summary of the values which it represents-the assumption being that there is very little variation about the mean.

These assumptions are justified here in that each cell of each matrix is a summary of values which have previously been classified into total expenditure or income classes. There is unlikely to be large variation in these close-bounded sub-samples. The analysis of variance was carried out in accordance with standard statistical practice which is outlined in Appendix B,5., and the results (Appendix A, tables 12.A & B.) are explained below.

B. The general structure of expenditures.

The components of variance both between rows and between columns are large enough to be considered significant when related one to the other by Snedecor's 'F' test (Appendix B,6). However, the between rows variance, which results from differences in the amounts spent on different items, regardless of family expenditure group, is by far larger and explains 63.0% of the total variance in the table. This means that nearly two thirds of the variation in the matrix is due to the different proportions spent generally on different items of consumption. There is however sufficient variance, 17.5% of the total, between columns, to suggest that different levels of total family expenditure do generate different structures of consumption. The large residual variance (19.5%) is due to variance within columns and rows.

C. The structure of expenditure on food items

Results here are similar to those obtained above. Both between rows and between columns, variance is large enough to be significant, and it is again the between rows component which explains most of the variance in the matrix (62.9%). The between columns variance contributes 24.5% of the total, and the residual unexplained component of variance is 12.6%. This means that whilst differences between total family income groups in terms of the structure of food expenditures are small, they are significant, and therefore worth analysing. In general one can conclude, with due regard to the assumptions laid down, that in both tables (36 and 37) there may well be significant differences between the expenditure/income groups in terms of their structure of expenditure on various items.

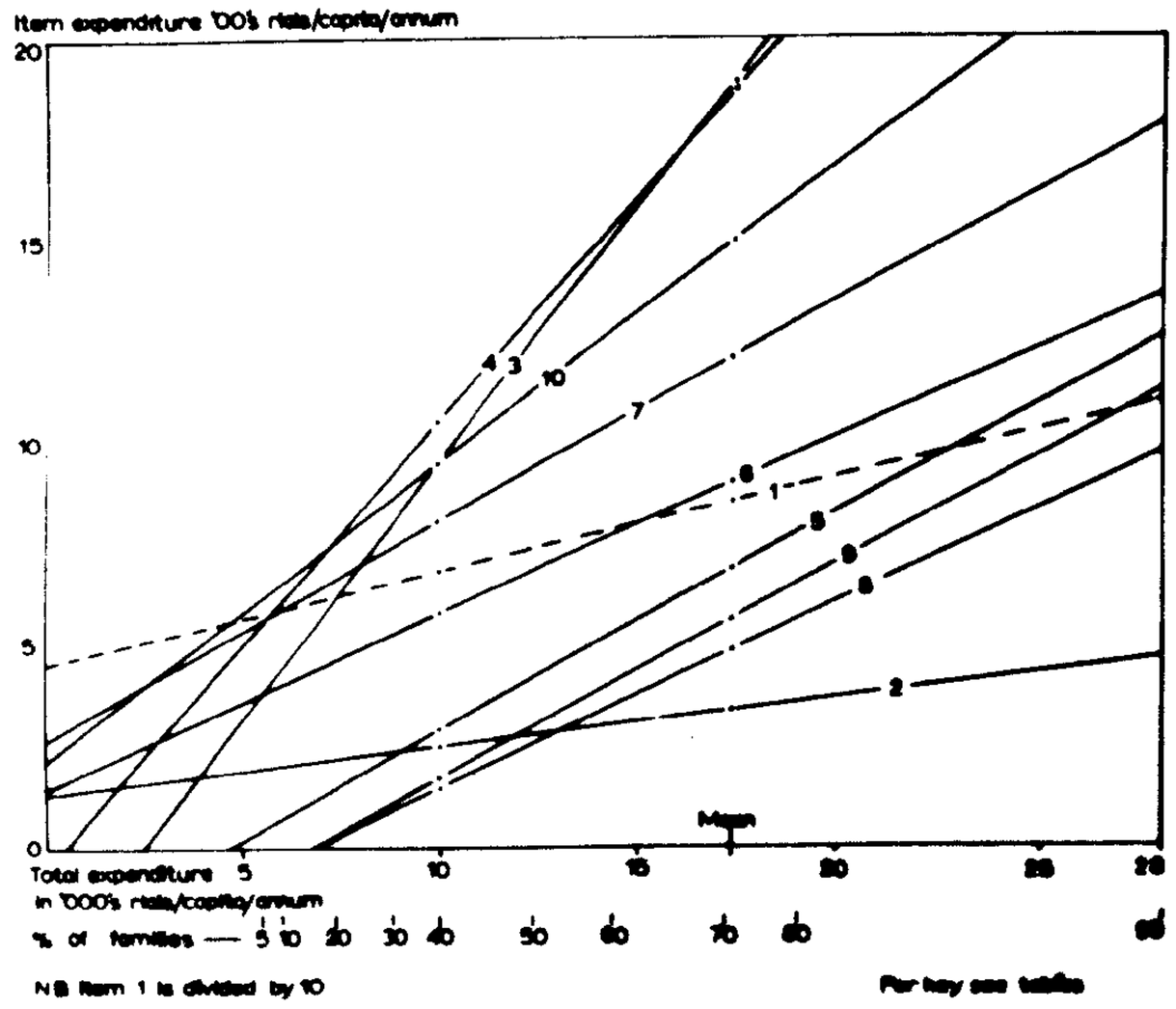
5. The structure of Consumption Expenditures. II. Differences in structure at various levels of Total Expenditure/Income.

A. Method

In order to appreciate the main trends in the expenditure structure, simple regression equations were fitted to each item in the two tables (36 and 37), by methods outlined in Appendix B,1. This assumes that the values in each row approximate to a straight-line curve, whilst the regressions generalise any fluctuations into a trend. Detailed results are available in Appendix A, table 13 (a and b), and the regressions themselves were plotted in Fig.30 (A and B). Finally, as an illustration of income/expenditure elasticities[4], the

REGRESSION LINES FOR STRUCTURE OF FAMILY PER CAPITA EXPENDITURES.

A. GENERAL STRUCTURE



B. STRUCTURE OF FOOD EXPENDITURE

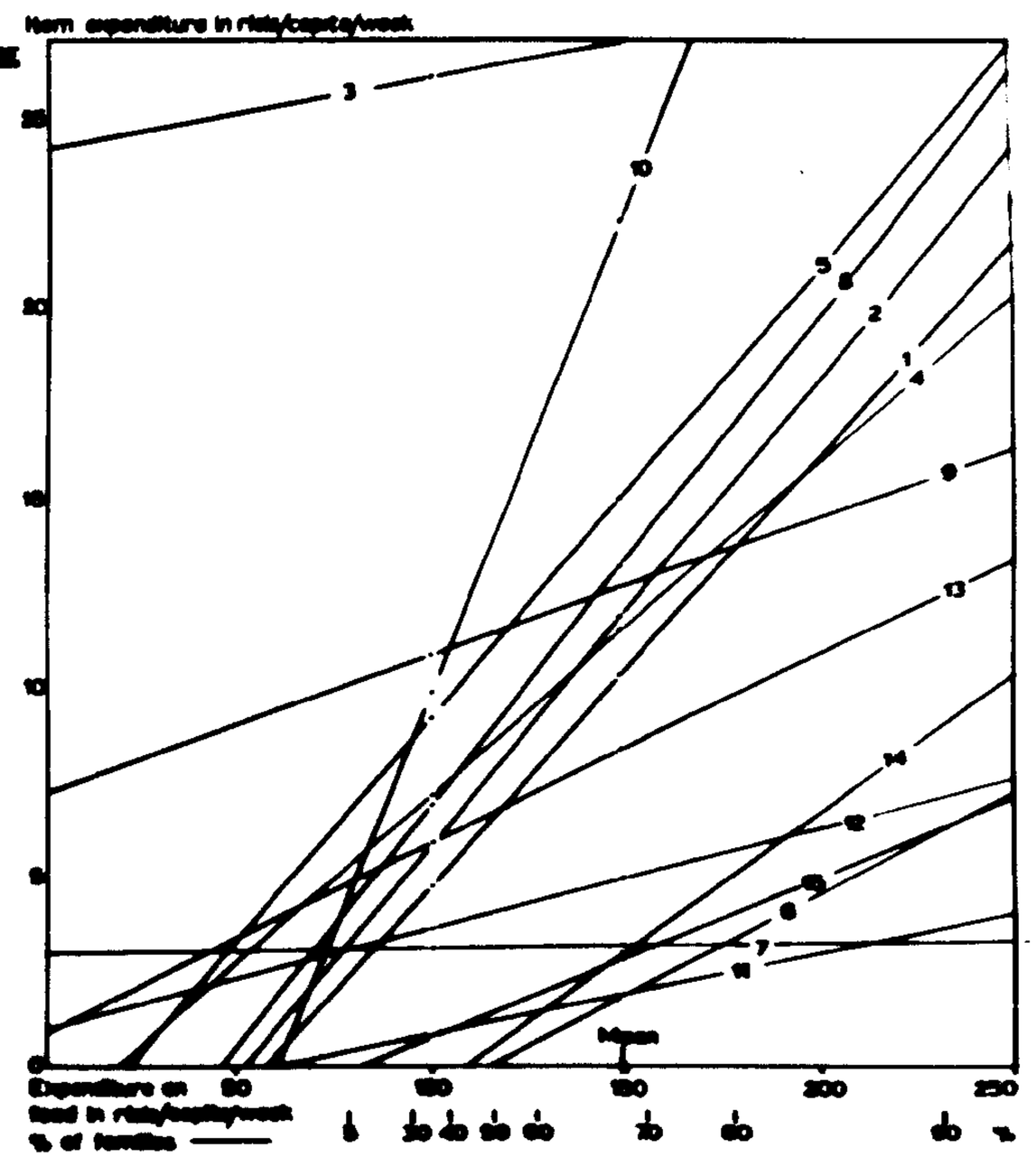


Fig. 30.

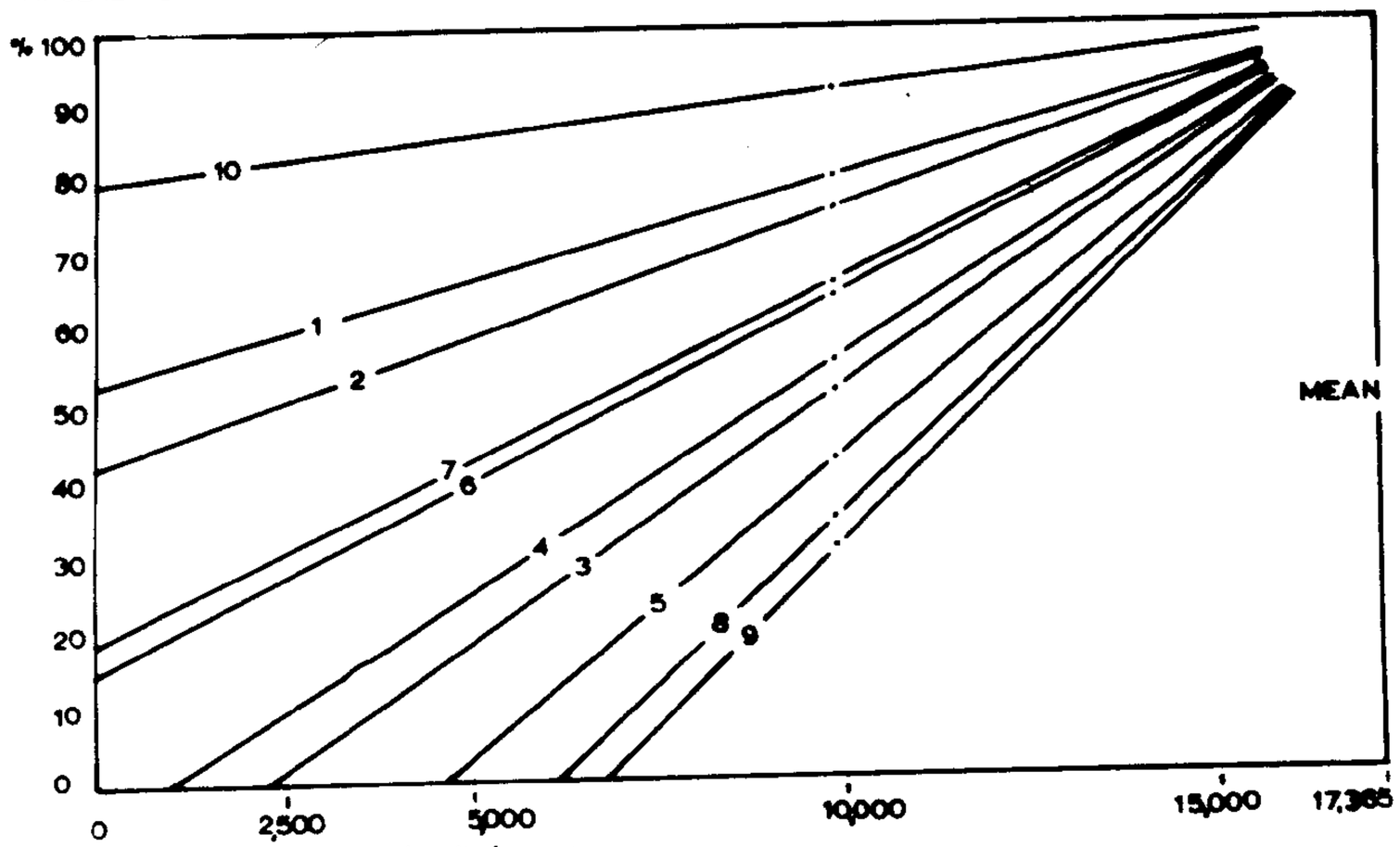
point (b) through which each regression line is drawn (for the general structure where a=10,000 rials per annum, for the food structure where a=100 rials per week) is expressed as a percentage of the mean value for each regression, letting the mean be 100%. The calculations are in Appendix A, table 14 (A,B) and the results are plotted as Fig. 31 A and B. This allows more easily a comparison of the slopes of the regression lines as they are affected by the level of expenditure on each item. With the regressions is also given a list of estimated elasticities of demand for the various items in each table.

B. Evaluation - The general structure of expenditure. (Figs.30A. & 31A)

Expenditure on food (item 1) is of course common to all expenditure groups; however, the absolute amount spent on food with each successive rise in total family expenditure increases only slowly, and proportionally this represents a decline from 65.2% for the lowest expenditure group, to 34.1% for the highest expenditure group. (Table 36). Consequently its elasticity is only .55. Tobacco (item 2) shows similar characteristics, though its consumption forms a much smaller proportion of the total. Proportionally it declines in importance as an item of expenditure as total expenditure rises (4.7% to 1.0%). With an elasticity of only .41, tobacco is not a 'luxury' in Urban Iran, and its limited consumption, even at higher income levels, is probably at least partially due to the religious injunction against its use.

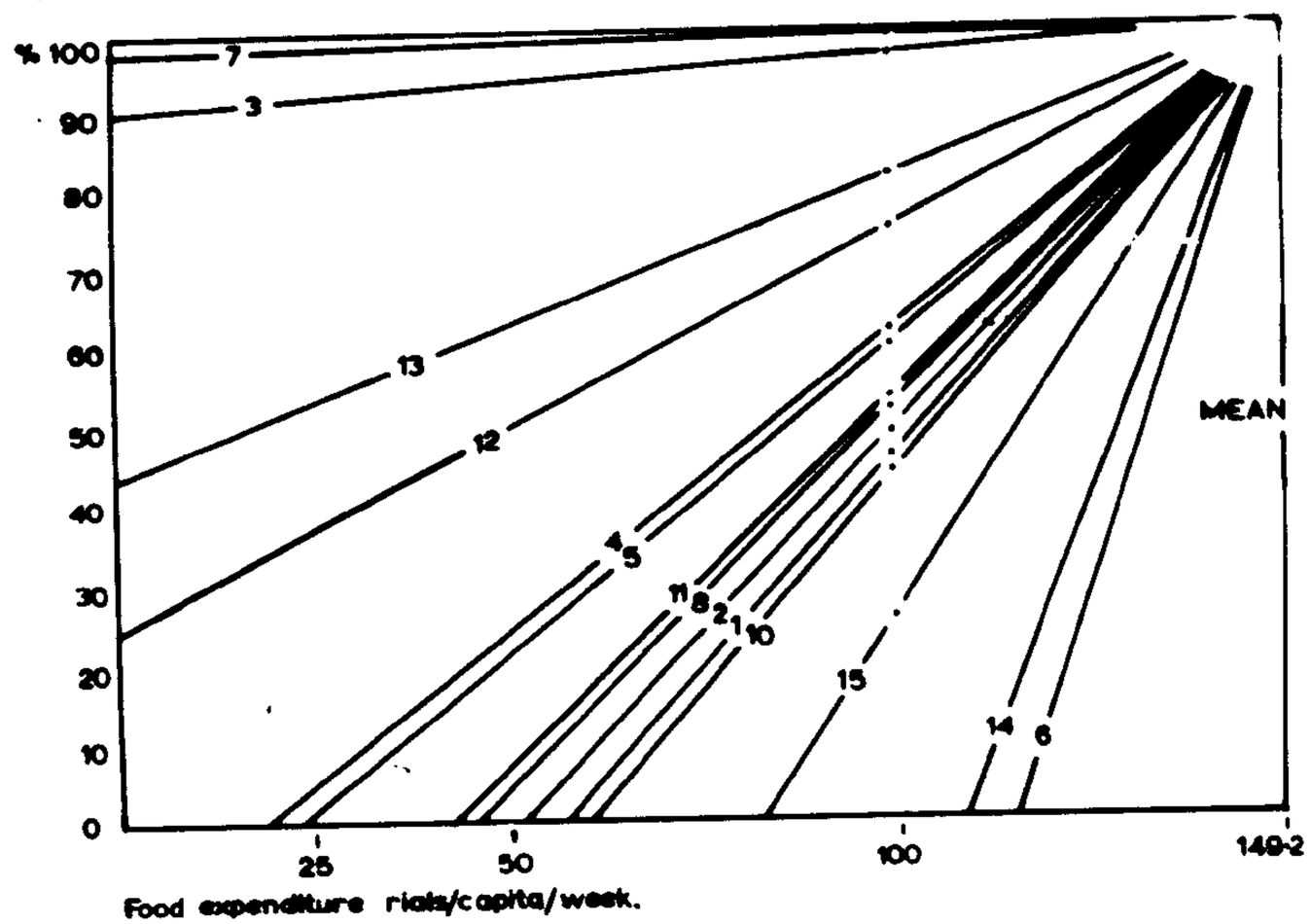
REGRESSION LINES FOR STRUCTURE OF FAMILY PER CAPITA EXPENDITURES EXPRESSED AS PERCENTAGE DEVIATIONS FROM THEIR RESPECTIVE MEANS

A. GENERAL STRUCTURE



For key see tables

B. STRUCTURE OF FOOD EXPENDITURE



Source Bank Markazi Iran.

Fig. 31.

Table 38

PROPORTION OF FAMILIES WHOSE TOTAL EXPENDITURE INCLUDES ITEMS 1-10, AGAINST ANNUAL NET MONEY INCOME — CLASSES. URBAN IRAN. 1959-60

Family Annual net money income (000's rials)	All Families	< 5	5-10	10-15	15-20	20-25	25-30	30-40	40-50	50-75	75-100	100-150	>150
1. Food and drink * consumed outside the home	63.5	29.0	26.8	38.5	50.2	57.6	63.1	67.1	66.8	72.1	70.4	79.4	77.0
2. Tobacco	68.0	51.6	48.0	65.8	63.8	69.1	65.8	70.8	69.2	70.0	75.2	67.3	70.5
3A. Rent costs	33.1	25.8	25.2	31.6	36.4	37.4	36.1	27.0	32.4	34.9	34.8	33.2	34.1
3B. Home ownership costs	41.8	25.8	27.6	25.1	30.4	30.9	37.6	45.6	44.5	45.0	50.8	56.1	52.5
4. Running costs and furniture	99.6	95.7	96.8	96.8	98.1	99.1	99.5	96.5	99.8	99.7	99.9	996	99.9
5. Clothes for females	96.0	83.9	83.7	87.7	94.0	95.0	97.3	97.8	97.3	97.9	98.8	67.3	98.5
6. Clothes for males	95.9	41.9	71.5	88.2	86.1	95.4	97.7	98.5	98.1	99.4	98.4	98.7	98.9
7. Services, personal and medical	94.5	80.3	82.7	86.1	87.2	93.2	98.2	95.8	95.1	96.6	98.6	97.9	97.6
8. Recreation & education	53.6	11.3	11.8	20.3	24.4	32.8	38.6	50.2	56.9	70.2	79.2	81.8	90.1
9. Travel	78.4	29.0	50.4	50.3	61.8	70.2	70.3	80.0	82.4	88.6	91.6	95.1	96.6
10. Contributions and other expenses	48.8	12.9	25.6	26.2	29.3	38.2	38.8	43.3	47.2	57.5	66.6	73.8	78.6
Total Families (10 not reported)	3217	31	123	187	283	262	263	456	364	524	250	223	261

* For Food in general, all figures are of course 100%

Source- Bank Markazi op.cit. 1959 - 60.

Expenditure on clothing, both for females (item 5) and males (item 6) and on personal service (item 7) increases in absolute amount, but proportionally there is at first an increase, followed by a decrease as total expenditure increases. The growth in expenditure on clothing for women is much greater than that for men, which is perhaps an indicator of the better social position of women in the higher income groups. Elasticities for these items (5,6 and 7) are about .80 to .83, and they occupy the middle ranges of the percentile regression diagram (Fig.31 A). The most highly elastic expenditure items would appear to be rent and house ownership costs (item 3), at 1.30. This item rises very steeply with an equivalent rise in total expenditure, but since it is an item of consumption possessed by even the lowest expenditure groups, it appears as only moderately steep in the percentile regression diagram (Fig.31.A.) Increases in expenditure, both absolutely and proportionally, are equally great for the two items recreation and education (item 8) and travel (item 9). More significantly, table 38 shows that item 8 is not available to 46.4% of the families, and that item 9 is not available to 21.6% of the families, since the costs are prohibitive to those families with low annual incomes. Recreation, education and travel are thus 'luxury' components of expenditure, the consumption of which increases much more than proportionally with an increase in total expenditure - thus elasticities are, for reading and education 1.30 and for travel 1.17. The regressions summarising these trends are the two steepest lines in the percentile regression diagram, Fig.31 A.

Thus food and clothing can be looked upon as 'necessity' items of consumption, available to about 100% and about 95% respectively of the total families in the sample (Table 38). Tobacco, the consumption of which is limited to 68.0% of the population, is despite this not a luxury item of expenditure, since the limited consumption is partly due to religious prohibition. At the other extreme are the 'luxury' items such as recreation, education and travel, the consumption of which increases quickly with income. In between these groups occur the rest-rent and home ownership costs, running and furnishing costs of the household, and personal and medical services. All enter into the budget of most families except the rent and home costs, since as pointed out earlier in this chapter, many families live in rent free accommodation, provided as part of a remuneration, and do not have a cash expenditure on rent etc.

C. <u>The Structure of food expenditure. (Figs. 30B and 31 B.)</u>

Fig. 30B indicates that in absolute terms, expenditure increases least on bread (item 3) rice (item 4) sugar (item 9) pulses and cereals (item 12) and tea,coffee and cocoa, (item 13). Unfortunately, data on the proportion of families whose budgets do not include certain items of food expenditure are not available. However, it can be seen that since the regression lines of the items above (3,9,12,13), excepting rice (4) all terminate on the y axis of Fig.30B, then it is probable that almost all families have these items in their expenditure patterns. Because of the slow rate of absolute increase, and the proportional decline in the consumption of these items as income increases, they are to be considered as

'staples', items of general consumption, the elasticities of which (between .27 and .51) are low. Rice has the highest elasticity of these foods, and it is possible that the poorest families cannot afford to consume it. Item 7, beef, pork and fish has almost no correlation with increasing income (+.05) and most of the population, even the wealthy, consume little of these products, the consumption of which is limited (like tobacco) not by considerations of income, but by social factors. There is little or no demand for them at any level of income.

Items 5-mutton and lamb, 8-fats and oils, 2-dairy products, and 1-food and drink consumed outside the home, share several characteristics in common. Absolutely, their consumption increases at a high rate with income, and at each successively high level of income a greater than proportionate amount is spent on them. Dairy products for instance account for only 7.6% of the food expenditure of the lowest income group, but 9.8% of that of the highest income group, (Table 37). Whilst all of them appear to be available for consumption to families of all levels of income, the poorest classes are only marginal consumers of these items (1,2,5 and 8), and can afford them only when the price is low. Thus mutton and lamb, which make up perhaps 90% of all the meat consumed in Iran, are not entirely a 'staple' item of expenditure, and may not be vailable to 100% of the families all the time. These items occupy the middle range of the percentile regression diagram (31B) and their elasticities are in the range .60 to .77. Item 11, canned fruit and dried fruit and nuts, whilst superficially similar to the above items, behaves

slightly differently in that it includes two different types of product. Thus whilst canned fruit is expensive in Iran and tends to be a 'status' food consumed on special occasions as a luxury, dried fruit and nuts are a more common item of consumption. The result is however that the regression line is, as for the items previously discussed, in the middle range of Fig.31 B.

The remaining items of food expenditure - poultry (6), fresh fruit and vegetables (10), 'other' beverages (14), and spices (and other foods) (15), also share characteristics which make it possible to group them together. These are the 'luxury' foods of Urban Iran and their availability is limited by their high cost to only a part of the total sample population as is indicated by the fact that their regressions terminate on the 'x' axis of Fig.30B, and they are the steepest lines of Fig.31 B, the percentile regression diagram. Elasticities are all above .50. It would seem that 'other beverages', item 14, mainly soft drinks but also alcoholic drinks, are not available to about 44% of the sample population. Similarly poultry (6) with the highest elasticity of all (1.54) is excluded by its cost from the diet of about 49% of the sample, whilst item 15, spices and other foods, does not feature in the diets of about 6% of the families.

Fresh fruit and vegetables, (item 10) whilst available to all but the poorest, have by far the largest increase in consumption with a given rise in income, both absolutely and proportionally, but since they are available to almost all, their elasticity is only .66. The explanation of this would seem to be that fresh fruit and vegetables are regarded (in Mashhad at

least) by the wealthy and the poor, in different ways. For the poor majority, item 10 is, when in season, a staple item of diet. As the harvest time arrives for each vegetable and fruit, there is a glut on the market, and prices are forced very low. The lack of storage, sorting and refrigeration facilities in Iran means that this is particularly noticeable and for a short period large quanitities of an inferior quality are available at low prices. This accounts for the sudden rise of regression 10 from the 'x' axis of Fig.31 B. For the more wealthy members of the community, a demand for fresh fruit and vegetables exists at any season, and price is less of a controlling factor, so that fruit in particular never forms a basic part of the diet at any one time. The price of fruit and vegetables to the wealthier groups is much higher and the goods are of better quality, - sorted, cleaned, and possibly graded. In Mashhad this distinction within a product group has an important spatial expression, since the low quality fruit and vegetables are common in the shops and streets of the old town at low prices, arrived at by bargaining; whilst good quality fruit and vegetables are almost entirely restricted to the new town centre, and prices are usually much higher, fixed by the shopkeeper at one level for all customers. This is one example of a trend which is obviously much more widespread in other types of products and, as will be seen later, it is an indication of the way in which consumer expenditure preferences, strongly influenced by income, affect the commercial structure of Mashhad, and particularly its central areas.

6. Other work on Expenditure Elasticities.

Analysis of the cross-sectional structure of expenditure elasticities,

using Bank Markazi data, was also attempted by Adib-Soltani in 1963[5]. He hypothesised that expenditure elasticities are not likely to approximate to a straight line as income increases, but must vary through the income range:-

> 'Gradually as the income rises more goods and services acquire the nature of necessities and once they are necessities, their income elasticities tend to fall'.

By plotting the exponential of the running means of classes of total family expenditure (per annum) against the running means of elasticities for twelve types of goods and services, Adib-Soltani claims to verify this hypothesis. However, since, he uses total family expenditure and not per capita family expenditure, his empirical findings do not bear out this hypothesis, for as shown (Chap.10) there is for Urban Iran a negative relationship between family size and per capita expenditure. His findings are however interesting in themselves. These show that for eight of the items chosen, namely -

1. Tobacco
2. Household running costs (fuel ,water, ice, electricity)
3. Furnishings
4. Clothing for females
5. Medical care
6. Recreation
7. Reading and education
8. Travel and transportation

elasticities at first increase to a point B, which is the saturation point of demand, then decreases to a point A, and finally increases again. Point A is thus the point on the scale of total expenditures where demand increases again- for better quality, superior articles of the same (or a substituted)type. For the other four items;

9. Food purchased in eating places

10. Clothing for males

11. Personal care

12. Food purchased to eat at home,

the trend is opposite, with a decrease to point A, an increase for goods of a better quality to point B, followed by a decrease again as the saturation point of demand (B) is attained.

These conclusions are of some interest in the light of earlier comments on the sonsumption of fresh fruit and vegetables in Mashhad. It would seem that the two different types of demand, for high and low quality fruit and vegetables would appear in Adib-Soltani's terms at each side of the point A. As total expenditure rises, there is a decrease in elasticity (or demand as measured by the proportion of the total expenditure spent) up to point A, after which demand increases again, as income continues to rise - but in this case it is demand for higher quality fruit and vegetables. It would seem that the assumption held in this thesis, of straight line relationships between items of expenditure and total income/expenditure, is a simplification of the real situation, and that fluctuations which do exist at points along

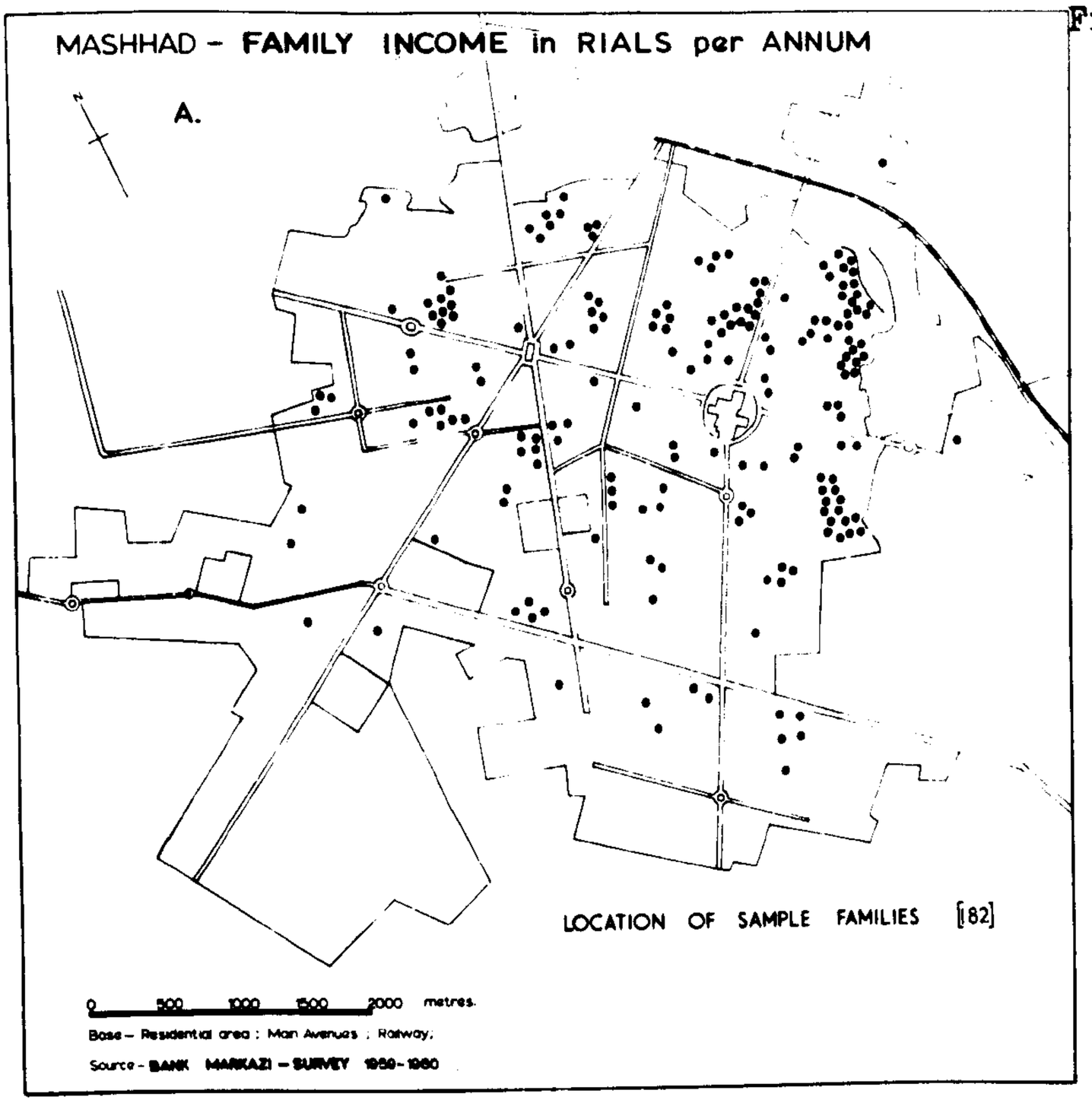


Fig. 32 A.

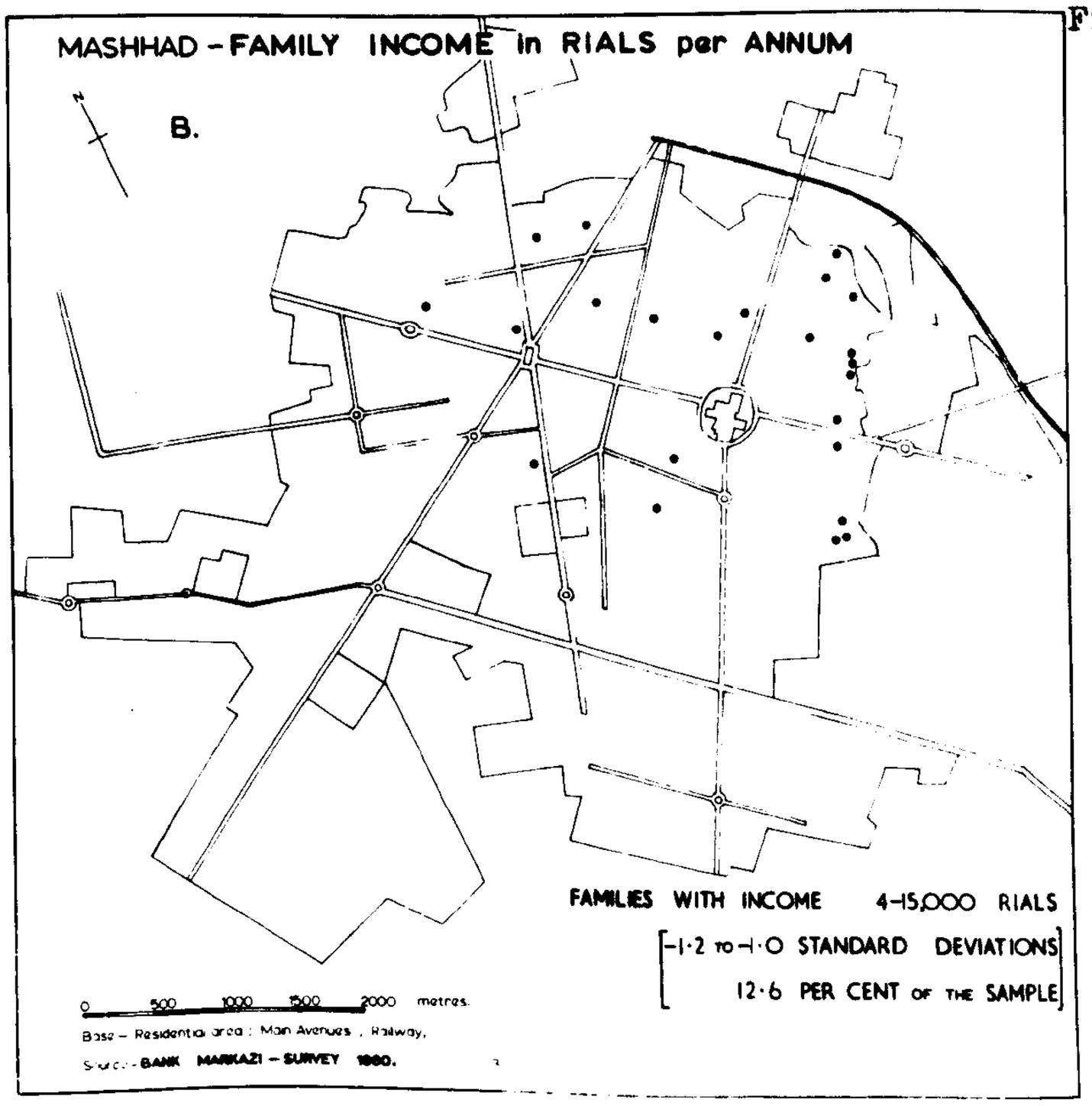


Fig. 32 B.

Fig.32 C.

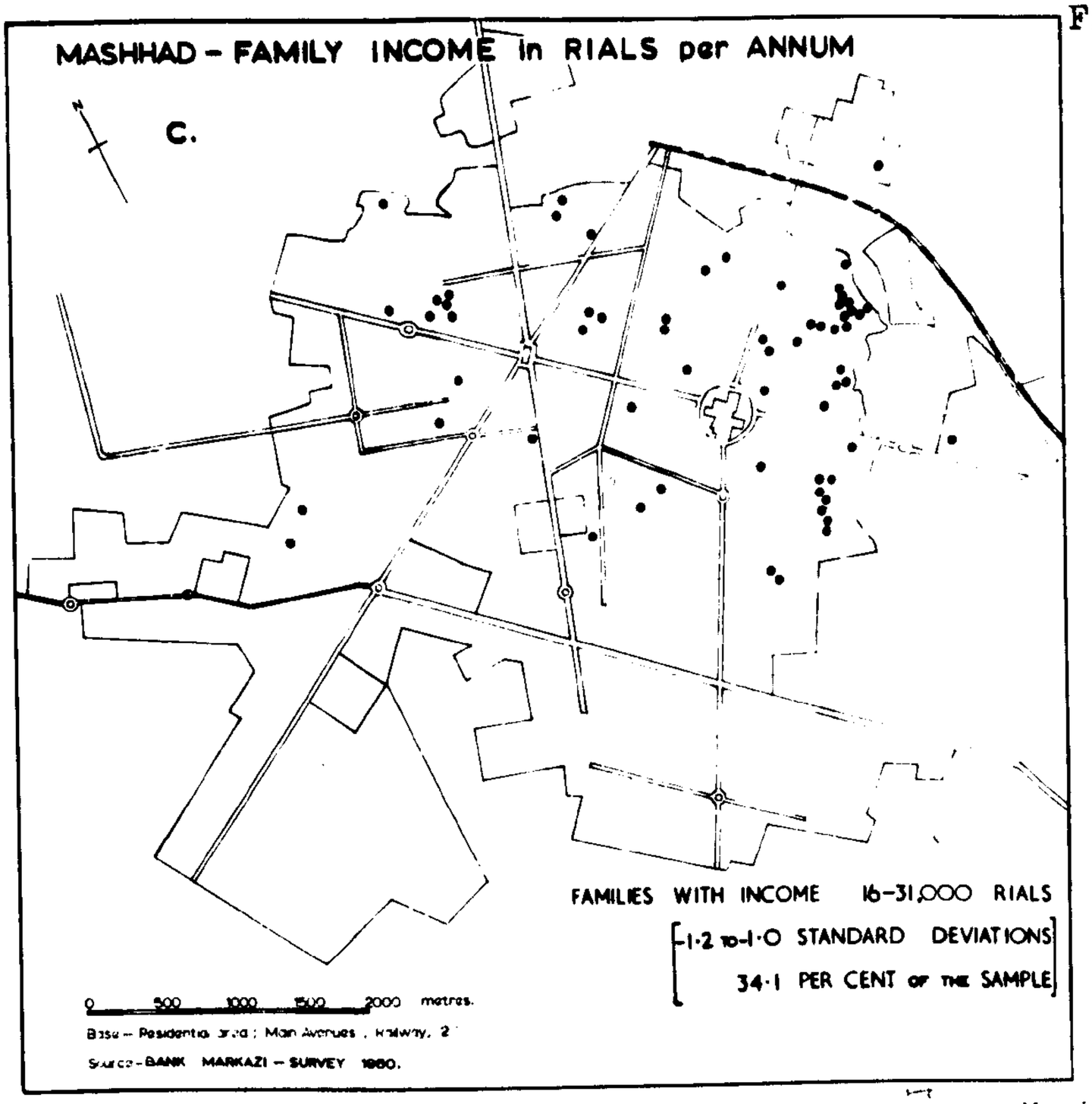
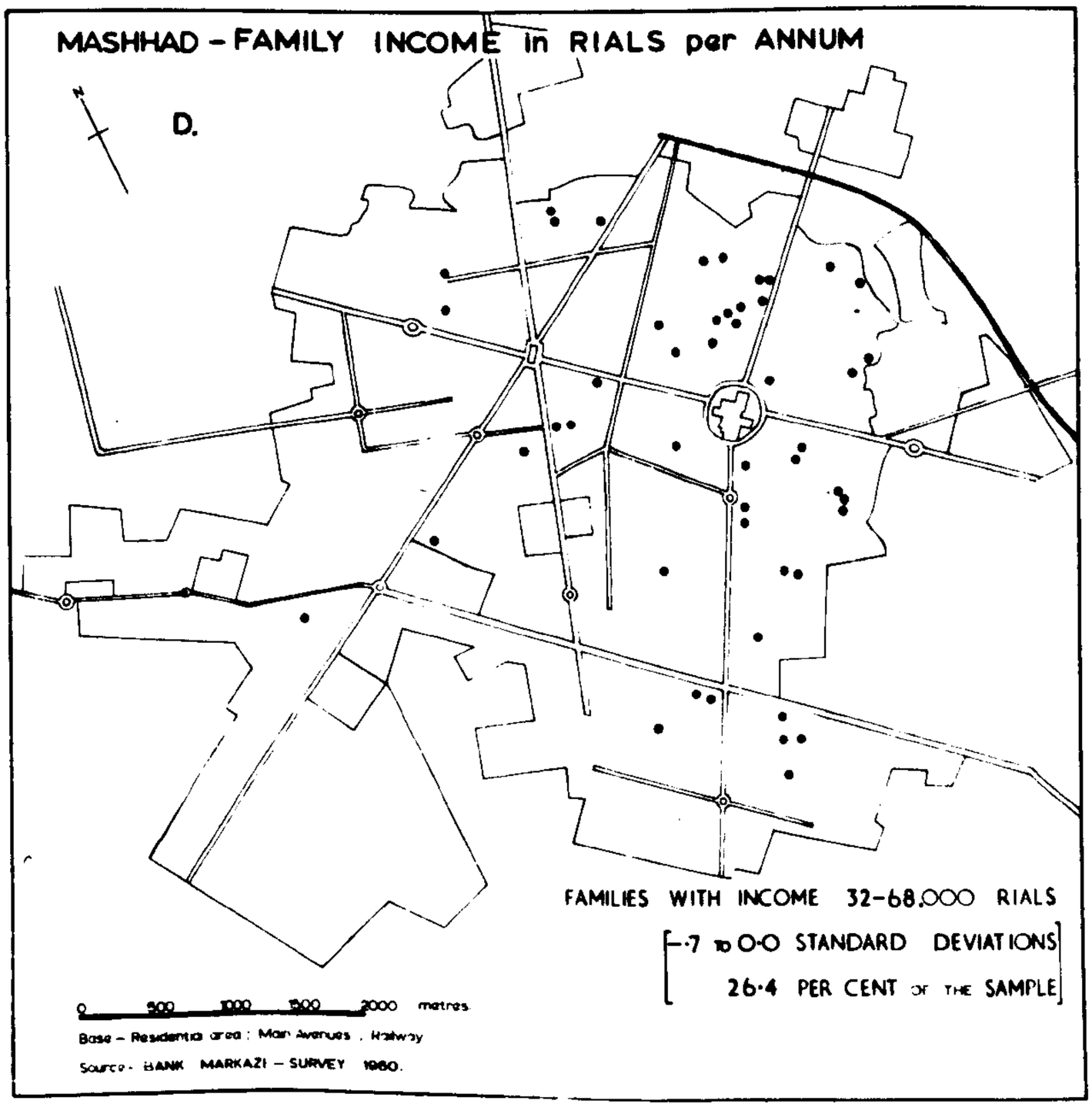


Fig.32 D.



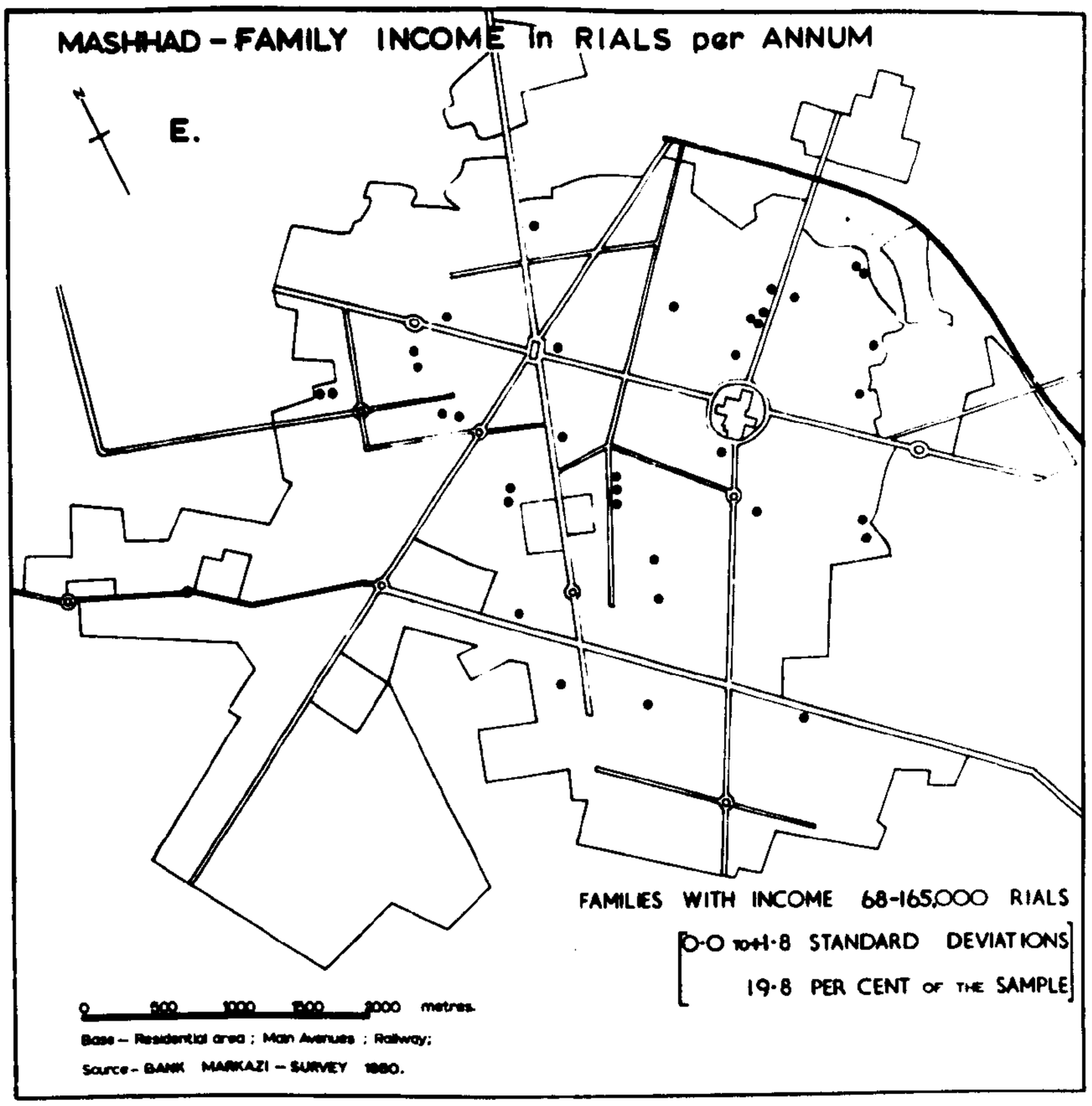


Fig.32 E.

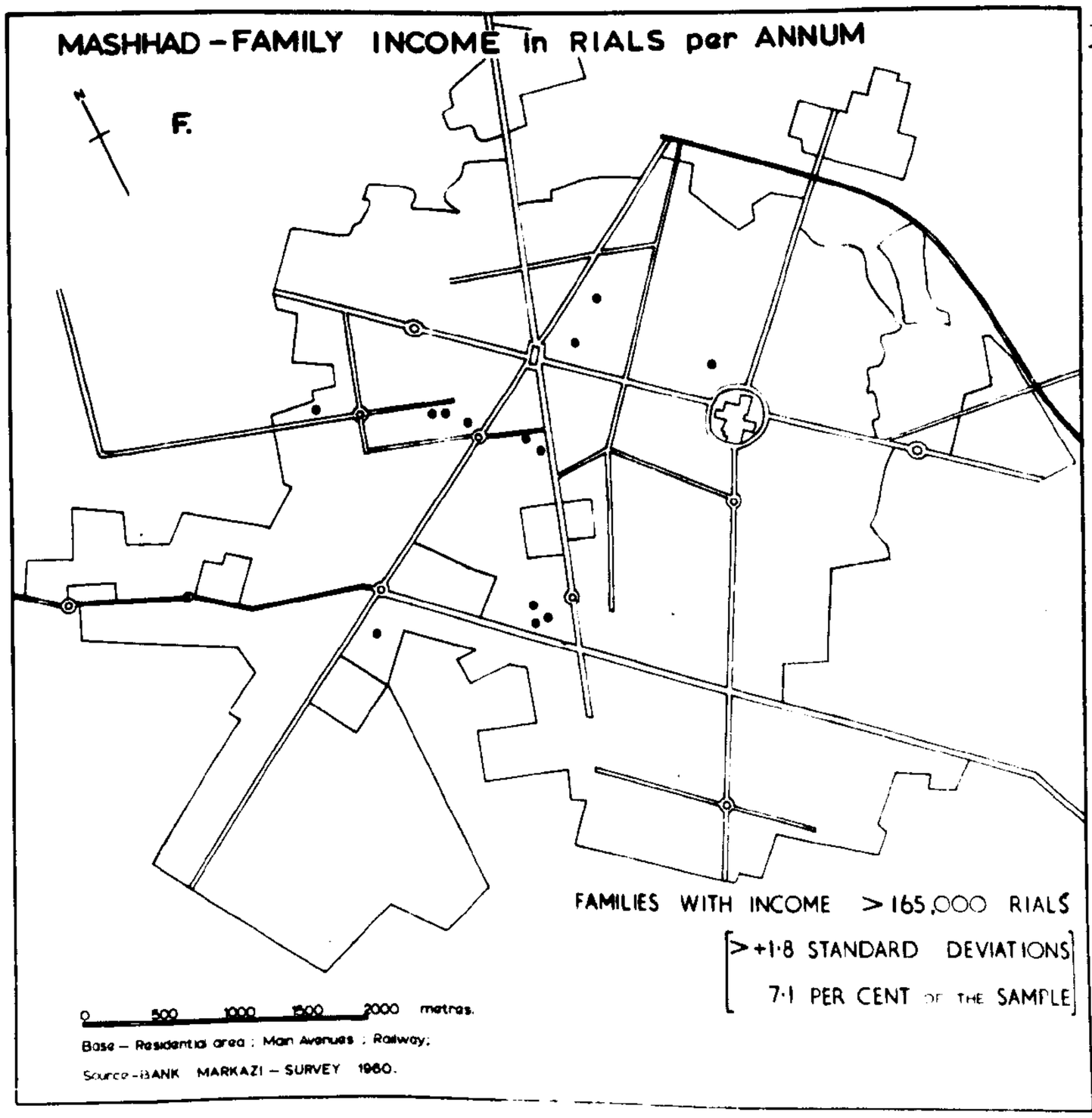


Fig.32 F.

the scale of expenditures may well be important. However, the simplified version presented here is preferred, since Adib-Soltani's empirical findings do not fully support his hypothesis. Future research, in Iran, or indeed elsewhere, may however prove him correct.[6]

7. The Geographical Distribution of Income and Expenditure in Mashhad.

From the data in the Bank Markazi Survey, distribution maps were drawn of both family per capita expenditure and family income per annum, based on the 182 randomly located households (Figs.32, A. B.C.D.E.F., and 33, A.B.) The small size of the sample, plus the fact that there is great variation in income levels over small areas, makes it impracticable to draw up detailed income 'regions'. Instead, the household income data are presented in a series of maps (Fig.32) showing that the trend in income distribution is from east to west (low to high) in the city. Each successive map in the series has an increasingly western distribution - evidence to show that at the household level, it is the richer who occupy the new town in the west, and the poor the old town in the east.

However, this conclusion is at best subjective and rests on the consideration of income data which was often under-reported in the survey, particularly amongst the wealthier families, thus causing bias in the results. Consequently, consideration of the distribution of per capita expenditure was essential, particularly in a quantitative framework. Two maps (Fig.33A and B) were prepared of the highest and lowest groups of per capita expenditure, representing 30.3% and 28.6% of the total sample respectively. The city was divided into three sectors, west (mainly new town)

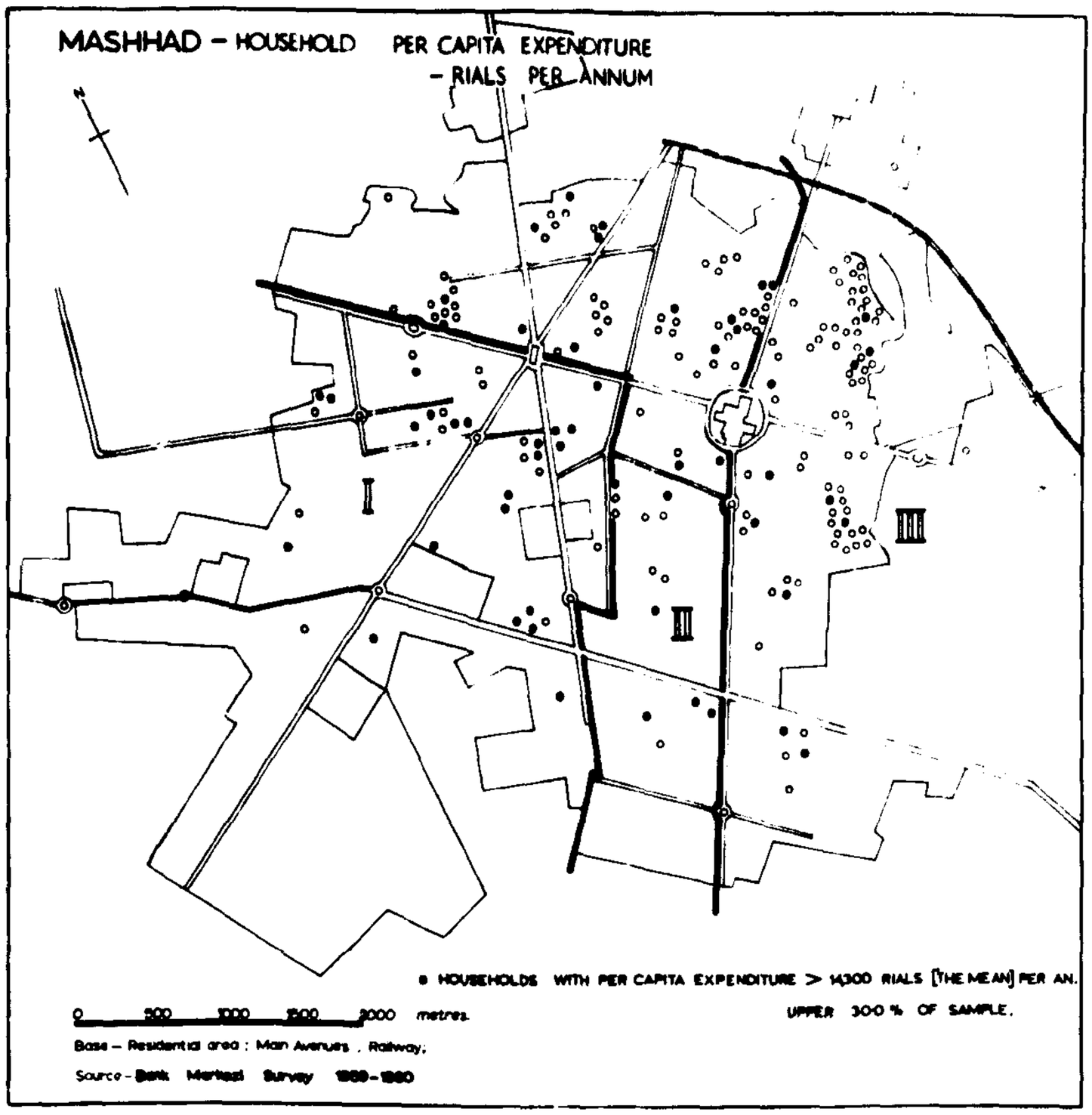


Fig.33 A.

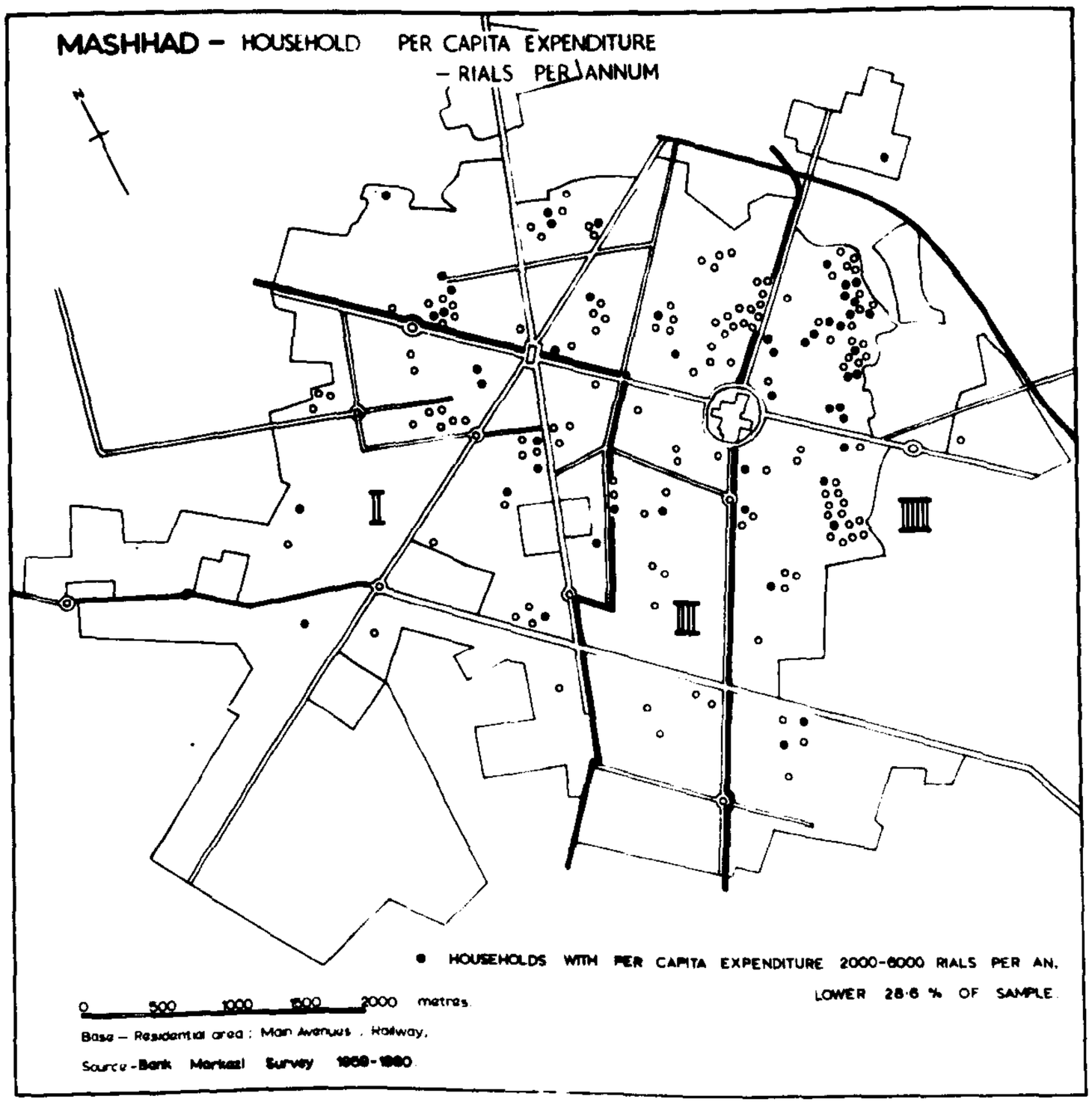


Fig.33 B.

central and north-west, and east (mainly old town). These sectors are not completely coincidental with the old town/new town divisions so far used, but are approximate.

For each sector the number of households falling into the particular per capita expenditure group under consideration (lowest or highest per annum) was compared to the total number of sample households. This procedure, a repetition of that used in the analysis of household size (Chap.10), yields two 3 x 2 contingency tables which were tested by the chi-squared test to determine the significance of the difference between the three sectors.

Table 38A.

DISTRIBUTION OF HOUSEHOLD PER CAPITA EXPENDITURE (per annum) in THREE SECTORS of MASHHAD 1959-60 (Explanation of Fig.33)

A. EXPENDITURE PER ANNUM >14,300 RIALS (>188 DOLLARS) PER ANNUM (UPPER 30.0% of TOTAL)

	I	II	III	Total
Total households in sample	34	94	54	182
Total households in this class (>14,300)	22	22	11	55
Percentage of total households in this class (>14,300)	65.0	23.4	20.4	100.0
Chi-squared value (significant at <.001%p.)	13.3	1.4	0.7	15.4
Percentage distribution of chi-squared	86.4	9.0	4.5	100.0

B. EXPENDITURE PER ANNUM 2000 - 6000 RIALS (26 - 156 DOLLARS) PER CAPITA (LOWER 28.6% of TOTAL)

	I	II	III	Total
Total Households in sample	34	94	54	182
Total households in this class (2000-6000)	8	15	53.7	52
Percentage of total households in this class (2000-6000)	23.1	16.0	53.7	100.0
Chi-squared Value (significant at <.001%p)	0.3	15.26	20.9	26.5
Percentage distribution of chi-squared	1.1	20.0	78.9	100.0

Source - calculated from Bank Markazi, op.cit. 1959-60.

The results (Table 38A) indicate that in both maps the differences between zones are very large, and the probability of their occurring by chance is less than .001 P. In Fig. 33 B, the lowest group, 53.7% of the households of sector 3 (old town) have a per capita per annum expenditure of 2-6000 rials, whilst sectors 1 and 2 have respectively 23.5% and 16.0% in this class. Moreover sector 3 'explains' 78.9% of the total chi-squared value. Thus there is a fairly intense concentration of the poorest families in the old town and its suburbs, though a minority of the group live in the other two sectors.

In the other map, Fig. 33 A, 65% of the households of sector I (new town) have a per capita per annum expenditure of more than 14,300 rials, whilst in sectors 2 and 3 the figures are 23.4% and 20.4%. In this case, the western, new town sector (I) 'explains' 86.4% of the chi-squared value, indicating an even greater concentration of the wealthy families in the west than that of the poorer families in the east. Considerable variation is however again evident in the quite large minorities of this, the higher expenditure group, living in sectors 2 and 3.

8 Summary and Conclusion

The frequency distribution of income and expenditure both for Urban Iran, and for Mashhad was shown to be in a highly skewed form, with many 'poor', few 'rich', and few occupying the middle ranges of income. This maldistribution of incomes is inherited from an earlier society in which a few wealthy families dominated the mass of poor. The fact that the

distribution is not even more skewed is no doubt due to the emergence of a horizontally organised society of classes, one of which, the middle class, though still in its infancy, is growing fast.

The analysis of the distribution of expenditure at different levels of income involves only small amounts ofdata, and a limited range of goods and services, and is therefore to be regarded as an illustration of trends rather than a comprehensive statement. Such a statement would need much more data, drawn from a wider sampling frame, and would have to include all possible products of consumption expenditures so that predictions could be made about the demand for specific products of a particular quality, at different levels of income. The analysis presented here does however indicate that real differences do exist in the structure of consumption expenditures for a limited range of products, at different levels of income.

The geographical distribution of family income and per capita family expenditure in Mashhad was shown to be such that the wealthier population tends to be in the new town, and the poorer population in the old town. The fact that the distribution is not an exclusive one is evidence of the incompleteness of the horizontal division of society along class lines, referred to above. Thus a minority of poor are still to be found in areas which are occupied predominantly by the wealthier families, and conversely areas of the old town still have a few wealthy living amongst the poor - another relic of the former vertical organisation

of society in which rich and poor of one kin tended to live in close proximity. The roughly contingent distributions of family income and per capita expenditure are a corroboration of the slight positive correlations of +.28 and +.08 noticed in Chap.10, between household size (number of persons), household income and per capita expenditure. This is a trend peculiar to Mashhad, since statistically significant negative correlations were obtained for the same measurements with reference to Urban Iran in general. In Chap.10 it was shown that, in Mashhad, per capita expenditure and family income are related directly to the age, literacy and work status of the head of the household, and inversely to household size; whilst in previous chapters various demographic characteristics, literacy, and the occupations structure were shown to have new town-old town distributions not unlike the distribution of family income and per capita expenditure seen in this chapter. The implication of this is that all these variables are related, and between them influence the demand characteristics of the population of the city, income being the chief limiting factor in the consumer preferences which have been outlined in this chapter.

In effect one can see that the two parts of the city, the populations of which have been shown to differ in many social, economic and demographic details, generate demands for different types of goods and services in different quantities, and at different qualities. This fact, along with other factors, controls to some extent the commercial and land-use structure

of the two parts of the city, old and new, and in particular their central areas. Illustration of this connection between the social and economic aspects of development in the city is however the concern of the third part of this thesis.

SUMMARY to Part 2

At this stage it is thought appropriate to provide a brief summary, in the form of a table, of the main characteristics of the old town and the new town, to which references can be made. (Table 39) The table generalises the major characteristics discussed in the text of Part 2, but details have been excluded.

It is not however intended to discuss the table at this point, since its full implications for the economic and land use structure of the city have yet to be illustrated. Discussion is therefore deferred until the general conclusion, in Part 4.

Table 39

SUMMARY OF PART II, MAIN CHARACTERISTICS OF THE NEW TOWN AND THE OLD TOWN, MASHHAD

CHAPTER NUMBER	MAIN CHARACTERISTICS	OLD TOWN AND SUBURBS	NEW TOWN AND SUBURBS
6	Population (approx.)	332,000, 74.3% of total	80,000 25.7% of total
6	Density (gross residential)	150 - 290 per acre	50 - 170 per acre
7	Sex ratio of household population over 10 years	indeterminate	
7	Sex ratio of household population aged 15-34	ratios generally below 1.157	ratios generally above 1.157
7	General fertility ratio	ratios generally above 1.513	ratios generally below 1.513
7	Dependency ratio (household population)	indeterminate	
8	Percent of population (over 10 years old) literate	below 52.8% min. 20.6%	above 52.8% max. 80.7%
8	Percent of population (males over 10 years old) literate	below 60.7% min. 31.6%	above 60.7% max. 93.5%
8	Percent of population (females over 10 years old) literate	below 33.6% min. 8.1%	above 33.6% max. 74.1%
8	Proportion of females (household population) 'active'	below 20.4% min. 4.0%	above 20.4% max. 41.5%
9	Occupations Structure dominated by:-	small shop owners, merchants, labourers, low worker status	professions, landowners, merchants, government employees. High worker status
9	Economic dependency ratio (household population)	indeterminate	
10	Size of households	small, 21.4% 1-2 persons; 12.0% >6 persons	large, 10.8% 1-2 persons; 36.9% 6 persons
10	Literacy status of head of household	low correlation with household size +.70	high
10	Work status of head of household	low correlation with household size +.90	high
10	Type of tenancy of household	tenant	owner-occupier
11	Migration (of household population)	Suburbs of both new town and old town have a large proportion of in-migrants. Most non-household in-migrants.	Few non-household in-migrants
11	Internal movements of population in the city.	Are out of the old town centre, to suburbs of new town and old town	
11	Origin of in-migrants (urban/rural)	For household population 63.1% urban in origin. Distribution indeterminate	
12	Annual family net money income	generally low	generally higher
12	Annual family per capita expenditure (rials per annum)	20.4% 14,300; 53.7% 2000-6000	65.0% 14,300; 23.1% 2000 - 60000
12	Per capita expenditure pattern	Many types of goods and services excluded, and lower quality of others common.	All goods and services including many not available to lower income groups of old town. Higher quality goods common.

Notes to text, and references

1. Opinion expressed to the author by Dr. A. Shahin, head of the department of Public Statistics, Tehran, and Dr. A. Jamai, head of the statistical branch of the Ministry of Labour and Social Affairs.

2. The term 'family' is used by the Bank Markazi in its reports and statistics. It is to be regarded as synonymous with the term 'household' used here. The two terms are used interchangeably in this chapter.

3. The terms 'rich' and 'poor' are of course relative to the particular population under discussion.

4. Income elasticity of demand for an item is usually defined as the per cent change in expenditure on that item, which would result from a 1% increase in total income. A value less than 1.0 indicates a less than proportionate increase and a value greater than 1.0, the opposite. The coefficients used here are mainly those calculated by the Bank Markazi.

5. Sharif, Adib-Soltani. 'An Analysis of expenditure elasticities' in Symposium on consumer expenditures, report of the CENTO conference, Istanbul 1963. See also. Homayoon, B. 'Changes in urban family expenditures and their relation to increases in national income' in the same publication.

6. Much valuable work on the analysis of incomes and expenditures at the national level, through time, has been done by Professor S.F. Kuznets in 'Quantitative aspects of the Economic Growth of nations' part 8, 'The distribution of income by size' in Ec. Dev. and Cult. Change. II, 2 Jan.1963.

PART III THE ECONOMIC STRUCTURE

13. Introduction

14. Land Use and Land Values

15. Organisation of the Bazar in the Past

16. Economic organisation and its response to Urban growth and technical change

17. Location of functions in central areas, and on the fronts of main avenues.

13. INTRODUCTION and THESIS

The third part of this thesis deals with the economic structure of the city and in particular the response of industry and commerce to pressures of modernisation which result in a characteristic structure of land-use in the city. An attempt is made also to outline the effect of the demand characteristics of the two populations identified (old town, new town) on the economic structure of the two city centres.

For the convenience of the reader, a general description of the present distribution of land use and land values is presented first (Chapter 14) After this follows an analysis of the economic structure as it was (Chapter 15), and the response of this structure to changes in the technical and cultural environment (Chapter 16). A statistical analysis of the resultant distribution of land use in the two centres and along the fronts of main avenues is the subject of Chapter 17.

The author is conscious of the fact that the description of the land value structure of the city might well have been left until the end. However it is impossible to distinguish between economic organisation, and land use/land values in terms of cause and effect; on the one hand land values can be viewed as the result of the many pressures on land caused by competing economic land use functions in the city; on the other hand the location of many of the commercial and industrial functions is an effect of the land value structure which is hypothesised to be related directly to relative accessibility. The description of land use and land values is placed first merely as a matter of convenience since a description in general terms make the explanations which follows more meaningful.

THESIS - RESPONSE OF ECONOMIC ORGANISATION AND LOCATION TO MODERN INFLUENCES

(i) In the past, the vertical organisation of the economy was expressed in specialisation by product, and resulted in location in bazars and caravanserai devoted to one product group in which all types of functions, retailing, wholesaling, production etc., were located. This, and the institutions which it subtended (such as the guilds) characterised the old town organisation and therefore location in it. A model of a bazar economy in the past has been constructed (Chapter 15) in an attempt to elucidate this.

(ii) Today there are three main pressures working against this former traditional system of organisation and causing a re-location of activities in the old town, and a new basis for location in the new town. They are briefly:-

(a) The possibilities of more intense specialisation due to the increasing division of labour in society, which is itself made possible by the growth of population in the city.

(b) Mechanisation and the adoption of technical innovations, which allows increases in productivity but necessitates a growth in the size of economic units, and has many other complex and indirect effects.

(c) Due to physical growth of the city, land particularly in central areas becomes more scarce, and since supply is limited, its value, price, and the rents charged all increase. This exerts the pressure on certain functions to move out of the city centres, and locate elsewhere.

(iii) In general the factors (a) and (b), above are responsible for providing within an industry the opportunity for functional specialisation, though this varies from industry to industry, dependent on certain qualifying factors. It is however the increasing price of land, factor (c) above, which is responsible for making such functional specialisation a necessity, and for causing a re-location of the separated functions in different parts of the city, in terms of land values and relative accessibility.

(iv) However the extent to which these changes characterise the present economic organisation and land use structure varies between old town and new town. In the new town, and in particular its central area and main commercial avenues, industries tend to be separated functionally into retailers, producers, or wholesalers etc., and these separate functions are located with reference to the price of land. This is partially due to the fact that the new town centre has grown up only recently, when the three factors (a.b. and c) were more fully operative, and partially it is because the population tributary to the new town central area has exacting and sophisticated demands, so that industries become specialised in order to satisfy these demands. In the old town centre and main avenues however, remanants of former vertical organisation, and location by product (in bazars) are still common and the three main pressures towards re-location have had less effect than they have had in the new town. The less sophisticated demands of the population of the old town are also, in part responsible for this situation.

The chapters which follow present data in illustration of the statements

made above, as far as possible quantitatively. However measurements of the factors hypothesised are difficult to make in the absence of reliable data. Consequently the quantitative content of the part of this thesis is limited in scope, and much of its rests on descriptive illustrations.

14. LAND USE and LAND VALUES

1. Introduction

2. Land Use

    1. Residential
    2. Functions on fronts of avenues
    3. Caravanserai
    4. Large factories and other plant.
    5. Gardens
    6. Land under speculation
    7. Administration and public services
    8. Derelict and non-functioning areas.

3. Changes in Land Use

4. Land Values

    a. Introduction
    b. Value of land on the fronts of avenues
    c. Sargofli, or Key money
    d. Price of land in interior blocks
    e. Cross-sectional comparison between frontal and interior values

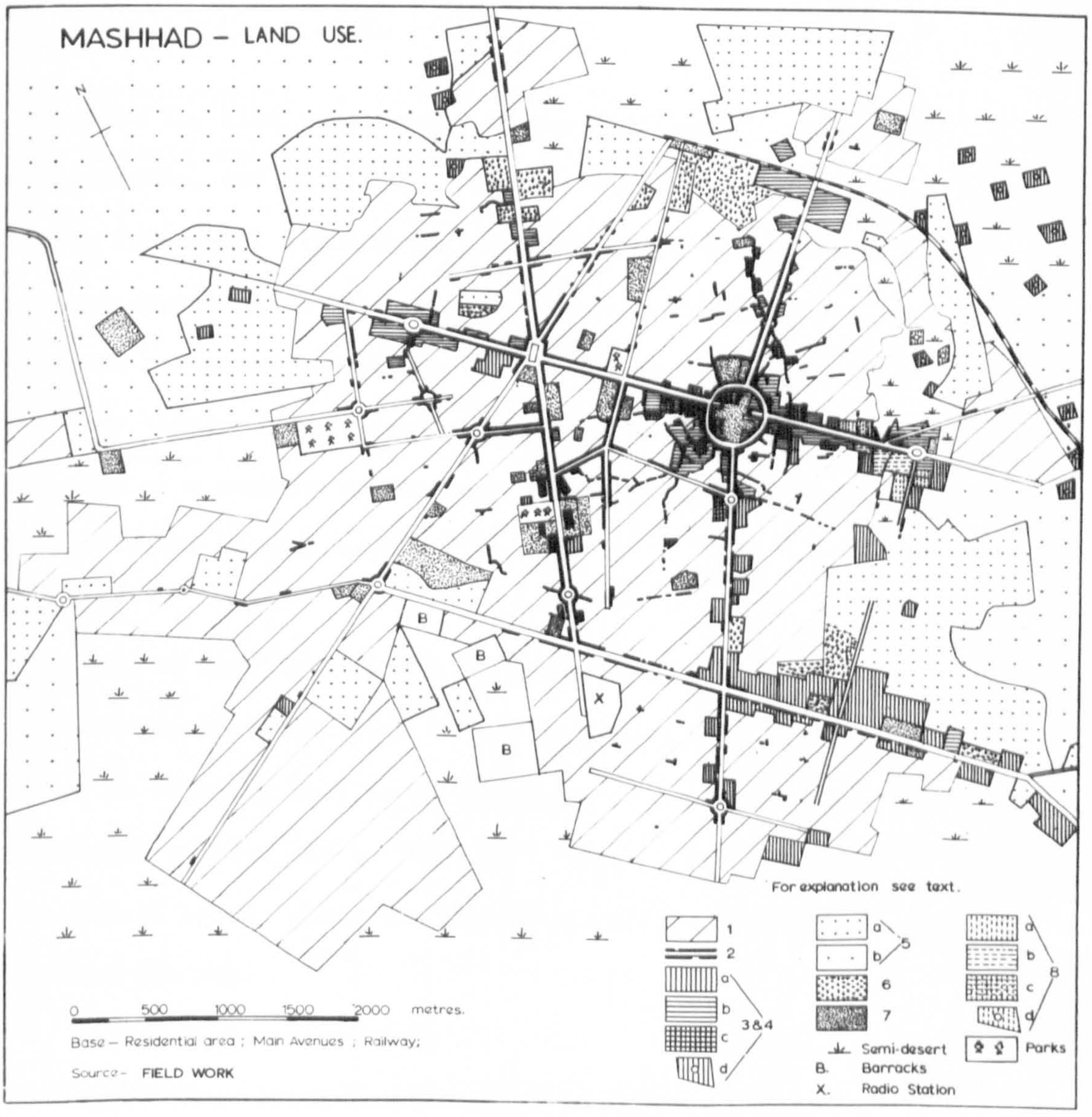
5. Summary

1. Introduction

Perhaps the most characteristic feature of land use in Middle Eastern cities is its complexity. This results from the fact that at the prevailing low levels of economic and social development, the division of labour and consequent functional specialisation is not fully developed. The lack of distinction in organisation between for example retailing and wholesaling, or retailing and production, is fully reflected in the spatial distribution of such functions within the city. Almost all land and buildings, even when considered square metre by square metre, are multi-functional. On the other hand there is traditionally within Middle Eastern (and Indian) cities geographical clustering by product, through a whole range of functions. Thus coppersmiths streets, goldsmiths streets, cloth dealers streets used to be common in which about all of the city's traders, producers, wholesalers, and retailers in that specific product were gathered. Specialisation in commercial and industrial organisation was thus vertical not horizontal - by product, not function.

We have seen that during the nineteenth century, society in urban Iran was still organised along clan lines, and characterised by vertical structure. The origins of this system were discussed in Chapter 4, as were the beginnings of the bazar system of economic organisation, which was in part a product of this vertically organised society. Remnants of the institutions of such a society, the mohallah (or heyat) the taifa, and the asnaf, or senf are however today

Fig. 34.


MASHHAD – LAND USE.
N
B
B
B
X
For explanation see text.
1
2
a
b
c
d
3&4
a
b
5
6
7
a
b
c
d
8
Semi-desert
Parks
B. Barracks
X. Radio Station
0 500 1000 1500 2000 metres.
Base – Residential area ; Main Avenues ; Railway;
Source – FIELD WORK

evident only on ceremonial occasions such as the processions during Mohárram, the religious month of mourning. Even the senf (guild) the institution which tied together clan and economic activity has little power today.

Mashhad is, like many cities of the Middle East changing its system of organisation, and in Talcott Parson's terms[1], functional specificity is replacing functional diffuseness as in society, in commerce, and in industry, horizontal organisation replaces the former vertical structure. These changes are reflected clearly in the structure of land use and land values in the city today. The distribution of land values in particular can be looked upon as a summary of the many complex pressures on the available land which exist in the city.

2. LAND USE

The map of land use (Fig.4) is intended only as a generalisation, since as pointed out, most buildings in the city have more than one function. The map is to be regarded only as an indicator of dominant functions, a summary of field work carried out in 1963-64. Each of the functions is discussed in more detail below, under the following headings, which are also the key to the land use map.

1. Residential zones
2. Commercial functions on the fronts of avenues
3. Caravanserai
4. Factories and other plant
   a. industry
   b. wholesale
   c. industry and wholesale
   d. brick factories

5. a. Gardens

   b. Other irrigated agriculture

6. Land under speculation

7. Administration and public services

8. Derelict and non-functioning buildings

   a. industry

   b. wholesale

   c. industry and wholesale

   d. brick factories

9. Barracks

However before these classifications are discussed in detail, a certain peculiarity in the development of Mashhad must first be dealt with. In western cities, with the advent of improved building techniques and the transport revolution there was in the late nineteenth and early twentieth century the well documented 'explosion into the countryside' which in part is still continuing today. Many cities in the western world experienced a particular type of development at this period. Due to the growth of mass transport facilities, cities tended to grow in ribbon developments along major routeways to and from the city - chiefly along railway lines on which steam or electric transport was used. It was only later in the twentieth century as the motor car became more common, that a personalised form of transport came within the reach of many, and as a result, the insterstices between the ribbon developments were filled in. This was particularly the

case in American cities, less so in European cities.

Mashhad however seems to have by-passed this mass transport type of development, and today the city is still remarkably compact, only stretching out along main roads to southwest and south east, and this is thought to be at least partially due to the lack of development of mass transport facilities. The railway only has two passenger trains per day, and there are only eight intra-city bus routes on which is operated an inefficient 'service' at irregular times by private owners of individual buses. Instead, there has developed a cheap taxi service, which along with the mass of bicycles in the city (estimated at 50,000 in 1963 by the Police Department) provides a personalised system of transport. The taxi system itself developed out of the once common 'durushki' service, of horse carriages, which operated with passengers bound for similar destinations in the city sharing the fare.[2] Few of the durushki are now left, but many of the drivers became taxi owners. For a sum of 5 rials (about sixpence) a taxi will stop on demand at any point in the city and deliver the passenger to any place within the city limits. The taxi is however free to pick up any other passengers on the way, whose destination lies in the same general direction as the first passenger, and all are delivered (in turn) at their respective destinations.

Because of this system, personalised motor transport is available to all but the poorest members of the society and has enabled the city to grow in many directions at the same time (excepting to the north-east), unhindered by considerations of nearness to a route along which mass transport facilities operate. However, this transport system has only been operative since about

1920, and Mashhad's growth outwards into the surrounding areas was delayed as we have seen (Chap.4). Nonetheless, as in western cities, there has developed the tendency for the more wealthy sections of the population to relinquish the advantages of centrality in the city centre, escaping rising costs and congestion by moving out to the periphery, creating the present suburbs of the city. This has the effect of increasing land values on the edge of the built up areas as land is converted from the agricultural to the residential function. It has also created a vacuum in the city centre which is being occupied by functions of a higher order such as shops, offices and hotels, as well as by the in-migrants who take over the vacated houses, creating multi-family dwelling units, and sharing the high rents. This process is however by no means as far advanced in Mashhad as it is in western cities, and in the larger Middle Eastern cities such as Tehran or Beirut, or Istanbul.

It is against this background pattern of growth that the land use structure of the city is best viewed.

1. Residential Zones

Some of the larger houses of the old town central area (particularly zone 5) are still occupied by their original inhabitants, as was discovered in the 1963 Survey. Many of these are rich merchant families, who clinging to older value systems prefer the centre of the city despite congestion and invasion by poor in-migrants, to the distant suburbs in the west and south.

Plate 15. The edge of the built up area near Kuh Sangi.(S.W.)

Plate 16.A suburb of the 'New Town',Sa'adabad.

Increasingly however the flight to the suburbs is dominant and those remaining are conspicuous by their small numbers. Large extensions to the city are evident in all directions except east and north-east, but as seen, the dominant direction of growth has been to the west. (Plate 15) However this western growth is not merely a suburb, for it has developed within it a new central area which appears in the map of frontal land values (Fig.37) at the cross roads of Khiaban Pahlevi and Khiaban Khosravi. The city thus has twin nucleii - two areas of high land values and tertiary functions - one still based on the Harram in the old town, and the other in the new town, which began its growth in the twentieth century (Figs.35 and 36). This phenomenon of twin nucleii is not confined to Mashhad, and occurs also in Tehran (where the two have almost coagulated) in Beirut, in Benghazi, in Tripoli (Libya) and in Istanbul and other cities of the Middle East. The growth of the second nucleus in Mashhad has meant that the 'centre of gravity' of the city is no longer simply the Harram and the bazars surrounding it, but is at a point mid-way between the two nucleii, and has therefore moved west. This in turn has left its mark on those areas of the north and east of the Harram which have become the 'twilight' zone of Mashhad. A severe decline has taken place in land values and property prices in this northeastern zone, Nogun, as the poorer in-migrants have moved in, and as it finds itself further removed from the 'centre of gravity' of the city. Difficulties of access for motor transport have accelerated this decline, and much of the property in this area is either totally non-functioning, or occupied by pilgrims and poor families, at high densities.

Details of the differences between residential zones of the city in terms

of the attributes of the families dwelling in them have been discussed at length in previous sections of this work. Functionally there are other differences however. In the more western residential zones (Zones 4,15, 20,26), residence tends to be the sole function apart from shops, schools and other facilities servicing the zones;(plate 16) but in the old town, home industries such as spinning or weaving or carpet manufacture are still important (see Table 40). This applies also to the southern suburbs of Zede Havai (zones 2 and 17) which as we have seen has many families who formerly lived in the more central areas of the old town, and still carry on their home industry. In addition to this, the old town residential zones tend to have isolated workshops and warehouses scattered through them, whereas this is not the case in the new town.

Table 40

MASHHAD CITY. HOUSEHOLD INDUSTRIES, 1956

	No.	%
TOTAL HOUSEHOLDS WITH INDUSTRIES	1,411	100.0
Carpet, rug, gelim production	128	9.1
Weaving, spinning, yarn processing	868	61.5
Cotton or Rice cleaning: cereal growing	54	3.8
Clothing and shoe production	141	10.0
Food products production	97	6.9
Extraction of non-edible vegetable oils	4	0.3
Soap and candles production	10	0.7
Other household industries	109	7.7

These represent about 10.2% of the total business units in the city

Source - Census of Iran, 1956

2. Commercial Functions on the Fronts of Avenues

Most commercial and some industrial functions are located on the main avenues shown on the land use map (Fig.34). In a survey of these establishments in 1963, the author found that about 10,000 out of a total of about 12,000 (about 75-80%) are located on the main avenues. The results of this survey are analysed in detail later. It can be noted however, that the business units were found to have almost all possible combinations of the following functions -

retailing

wholesaling

producing

tertiary functions - hotels, restaurants, banks professional and other services.

In fact about three-quarters of the 10,000 units surveyed were multi-functional. These units tend for historical reasons to be of a similar physical size, with a frontage of three to four metres (Plate 5), and expansion of a business usually takes the form of the absorption of neighbouring units. The functions most well represented are those for which access to customers is important, so that wholesalers and producers are rare by themselves and some combination of these with retailing is more common. Second stories, where present, are usually occupied by hotels, lodging houses, offices, or doctors' and dentists' surgeries, and very occasionally residences, most of which are being converted, or re-built as hotels and offices. Rarely in

382

KEY TO FIGURE 35

Land Uses

i Residential

ii Commercial functions on the fronts of avenues and bazars

iii Wholesaling, manufacturing, in caravanserai

iv Caravanserai used as bus termini

v Masjids and other religious buildings

vi Religious colleges (madrehsah)

vii Open spaces for religious observance

viii Lodging houses (mussafakhaneh)

ix Hotels (and mehmankhaneh)

x Secular schools and administrative buildings

xi Public baths

1 - 6 Locations for survey of price

Locations

A. Bazar Sarshur

B. Carpet bazar

C. Bazar Bozorg

D. Timber bazar and caravanserai

E. Stone carver's bazar

F. Bazar Bozorg (central)

G. Shoe bazar

H. Bazar-i-Tabarsi

I Bazar Sangtarshah

J. Bazar Hadj Agha Jahn

K. Old clothes bazar

L. Samovar makers

M. Kutche Sia Ab (north)

N. Kutche Sia Ab (south)

O. Gelim bazar

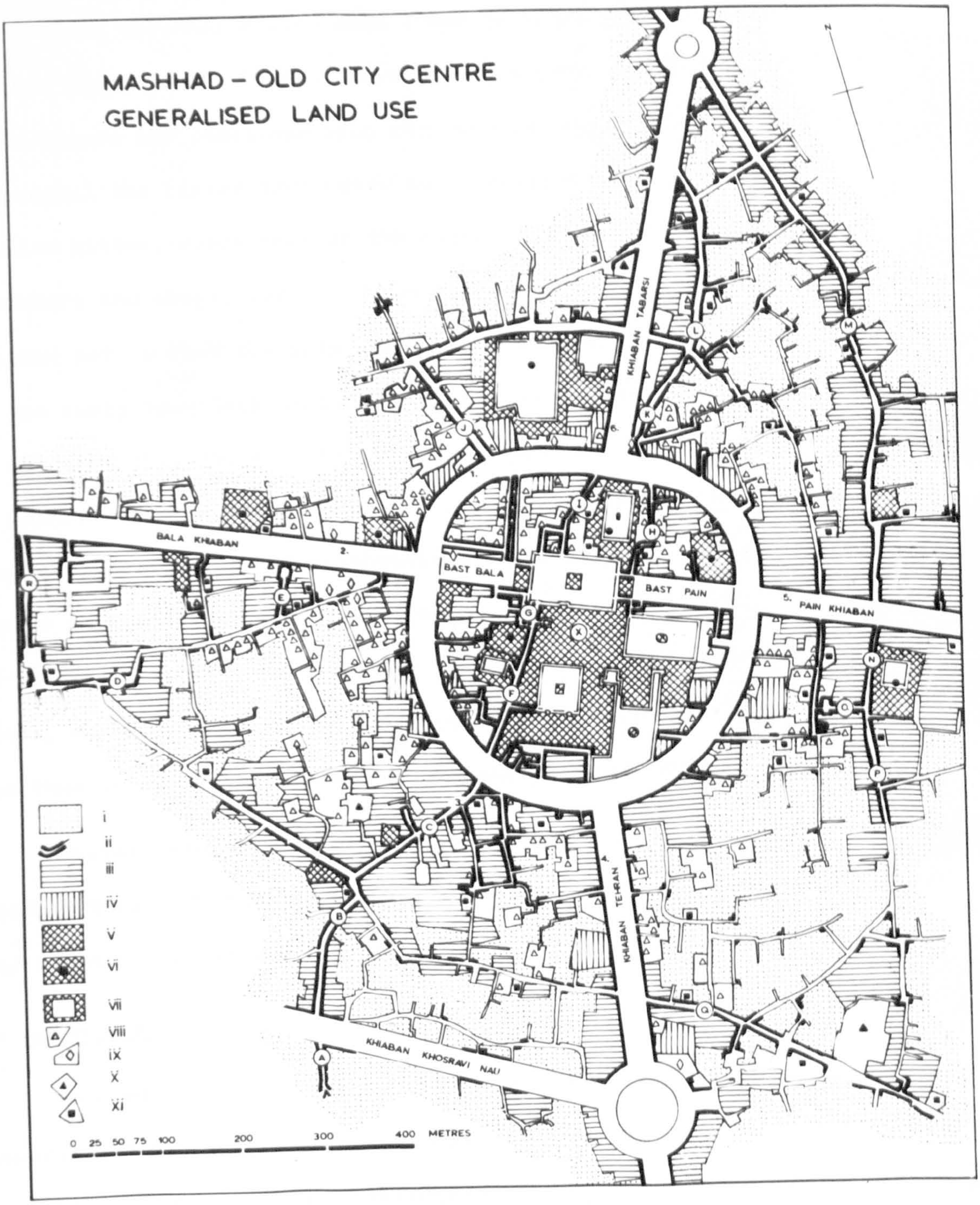
P. Dyer's bazar

Q. Kutche Aidgah

R. Kutche Chahar Bagh

X. Centre of Harram.

Fig. 35.


MASHHAD – OLD CITY CENTRE
GENERALISED LAND USE
N
KHIABAN TABARSI
BALA KHIABAN
BAST BALA
BAST PAIN
PAIN KHIABAN
KHIABAN TEHRAN
KHIABAN KHOSRAVI NALI
i
ii
iii
iv
v
vi
vii
viii
ix
x
xi
0 25 50 75 100 200 300 400 METRES

Mashhad are upper and lower floors connected functionally and usually there is no internal access from lower to upper floors. This generalisation applies least in the bazars where the declining residential functions of upper floors has sometimes been replaced by commercial expansion from below. In general the bazars have never been as important in Mashhad as in other Iranian cities, since some of the major avanues, which attracted both customers and shops, were laid down at an early date (Shah Abbas, 1601); and decline set in when the main road system was further expanded by Reza Shah in the early twentieth century. Today few specialised bazars are still in evidence (Fig.35) as other pressures against their survival are exerted by modern economic conditions. The carpet bazar, the shoe bazar, and other small collections of establishments such as dyers, or stone cutters survive due to peculiar economic circumstances yet to be discussed. In general many of the main bazars leading to the Harram are now dominated by shops selling beads, cheap jewellery, and other goods to pilgrims and tourists - the bazar has thus in some parts become a mere curiosity of no large economic importance.

However detailed discussion of the bazars and the relationship between product dealt in, functions, size of establishment by number of employees, and frontal land values, is the subject of later chapters.

3. Caravanserai

Located behind the main avenues and bazars to which they have direct access, are the caravanserai. This is an ancient form of building of 1-2 or perhaps 3 stories, in a rectangular shape with a courtyard in the centre

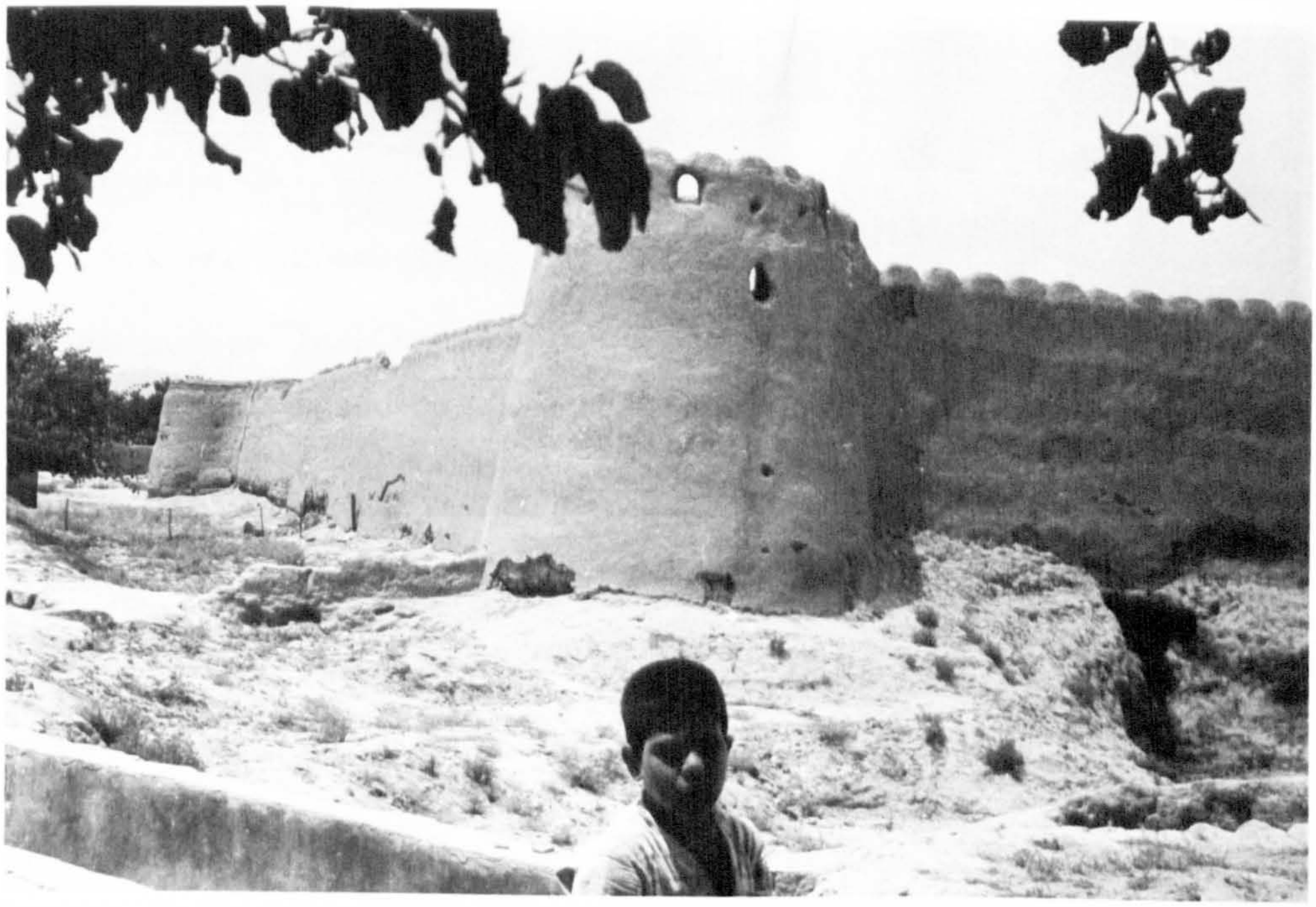


Plate 17. A caravanserai of the old type, near Mashhad.

Plate 18.

A caravanserai on Pain Khiaban with narrow entrance.

(Plate 17). Its original function was, in urban areas as a reception centre for the caravans of camels by means of which almost all inter-city trade was carried out in Iran until the late-nineteenth century. The ground floor was used to store goods and as stables for the animals, whilst the upper stories were given over to accommodation, and office space. These original caravanserai have a narrow entrance in the form of a tunnel under the first storey which could easily be barred by a heavy wooden gate to protect thevaluables inside. (Plate 18) Their function was thus largely as a warehouse, transport hostel, and point of exchange. Additionally if the goods were to be processed, then workshops would also be established so that a vertical organisation was (and often still is) the most common one. Each caravanserai specialised in a particular product, or product group dealt in by buyers, sellers and producers who rented from the owner (or his agent) space for office, storage or workshop. In Mashhad the caravanserai has also performed the function of hotel, or lodging house as it does today, for pilgrims to the Harram. In the past pilgrims normally travelled with caravans for the sake of security and as Gibb and Bowen[3] indicate that the majority indulged in petty trading and message delivery as a means of livelihood whilst away from home. In the Muslim world there has always been a strong connection between pilgrimage and trade, and pilgrims were often (unofficially) allowed to trade without customs dues and taxes, especially in such towns as Mashhad, Nejef and Kerbala which depended on the pilgrim trade to a large extent.[4]

Today, the caravanserai have functions similar to those of the past, though modified by the technological changes of this century. The caravanserai of the central bazars have lost their wholesaling function, as access for motor vehicles carrying bulky goods is difficult. Instead these central caravanserai under the descriptive term 'serai' are mainly the offices of the larger merchants and brokers who do business without handling the goods which either pass direct from seller to buyer, or are stored elsewhere in the city, where access is easier, and rents much lower. (Plate 19) Some of the caravanserai along Pain Khiaban for example are the storage points for these merchants. This is one example of economic pressures causing specialisation of function, which in turn is expressed in spatial terms in the city's land use. Where central caravanserai still receive goods or have a producing capacity, the goods are usually of small bulk and high value such as imported hardware, or turquoise, the provision and cutting of which is a Mashhad speciality. Similarly, functions requiring large amounts of space, easy access, and low rents have moved to new caravanserai which are growing up at various places in the city. The many specialisations and minute divisions of labour in the motor vehicle repair industry are almost all located in the caravanserai along Kh. Tehran, and Kh. Bahar - which is the main route out of Mashhad to Tehran, and the south of Khorasan. These are new caravanserai, built on old the plan, but out of modern materials, and designed specifically to house 20 - 60 small mechanics' workshops - yet location by product, evidence of vertical organisation is still present, with each caravanserai specialising in one particular make of vehicle. The entrepeneur holding the import licence

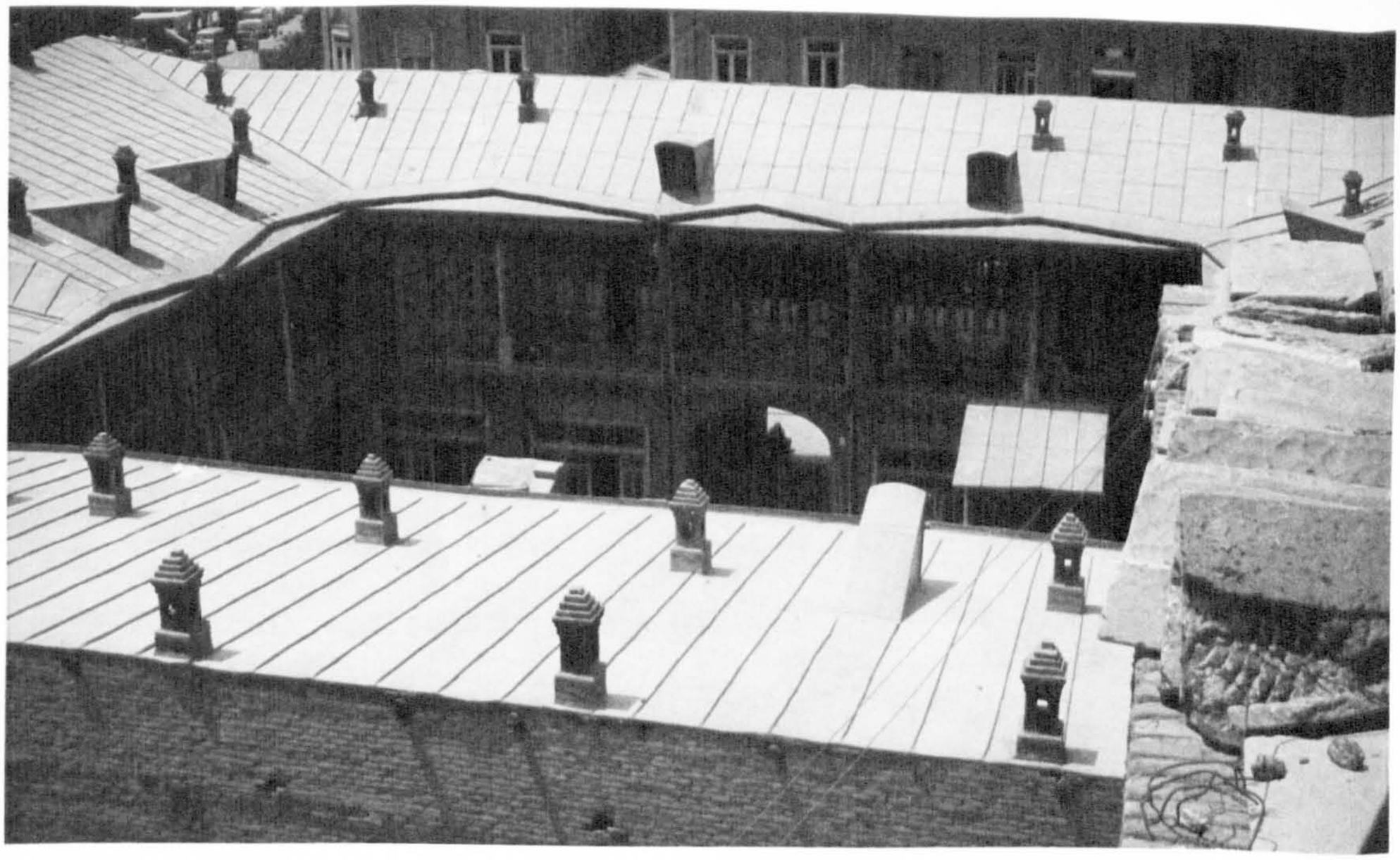


Plate 19. A re-built caravanserai (serai) near the Harram.

Plate 20.

A suburban brickworks.

for that particular make of vehicle also has his salesroom in the caravanserai with modern showroom windows facing the avenue.

Caravanserai dealing with fresh fruit and vegetables are almost all located at the western end of Balakhiaban, near the other exit road to Tehran (by the northern route). A caravanserai recently erected in this area for fruit and vegetables dealers financed by local government is evidence of official recognition of this localisation of the market.

Some of the more central caravanserai - chiefly those located on the roundabout around the Harram, are now used as bus termini for long distance inter-city bus services, thus retaining a long established type of function, but in modern guise. There are a total of 23 of these 'otobusleri' located chiefly near the Harram (Fig.35), and it appears that the value of centralised termini for inter-city buses is thus great enough to support the payment of higher rents engendered by central location.

4. Large Factories and other Plant

These are few in number in Mashhad where the effect of large scale mechanisation and industrialisation is still only limited. They are:

1. Cotton spinning - two factories
2. Ice production - one factory
3. Oil storage and distribution points - two factories
4. Soft drink bottling - two factories
5. Brick factories - a total of eleven
6. Sugar factory (not yet complete)

The location of these plants is interesting in that being largely industrial enterprises, and the product of advanced technology, they conform to modern economic location factors. All but one of these plants is outside the built up area. The road to Tehran (Kh.Bahar in the south-east) houses the ice factory and the large spinning factory on flat land easily accessible to road transport, and with room for expansion. In the same direction is located the main oil storage plant for the city - though this is out of town beyond the airfield. The new sugar-beet factory, a product of private enterprise, is in the same area, located between road and railway on flat land which has an aquifer beneath it. The brick factories are chiefly to the north east of the city beyond the railway on land which has little alternative use and is of low value, but yields the necessary fine clay. (Plate 20) Near the railway terminus is a second oil storage plant which receives oil by rail, and was set up before the six-inch pipeline reached Mashhad, feeding the new plant in the south east. The two bottling plants are in the south-western suburbs using the supplies of fresh water which are available.

5. Gardens

This form of land use, a type of intensive market gardening producing for the urban market, is common in western cities, and appears also in and around cities of the Middle East. Much of the physical expansion of Mashhad's built up area has, since 1750 been into these

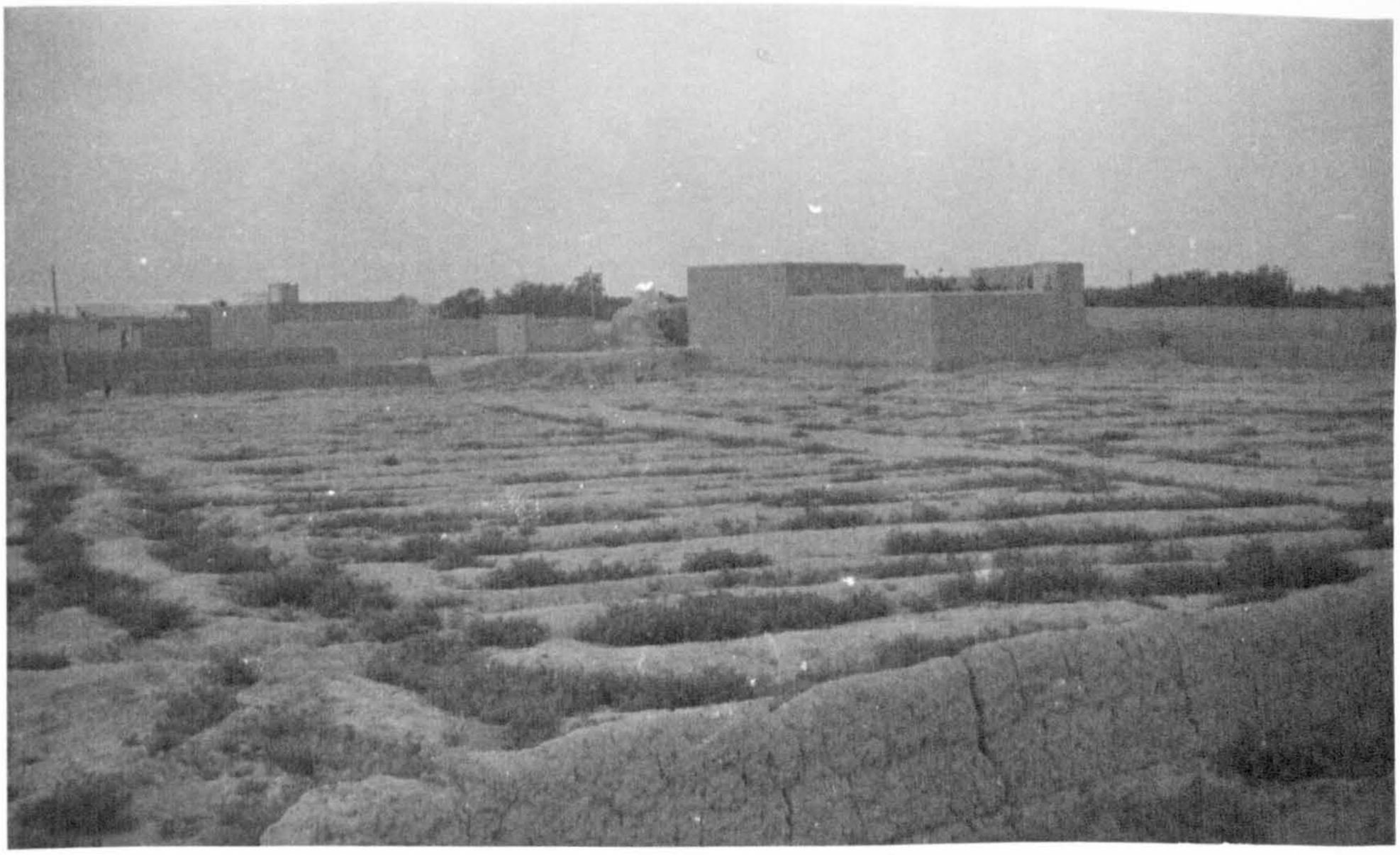
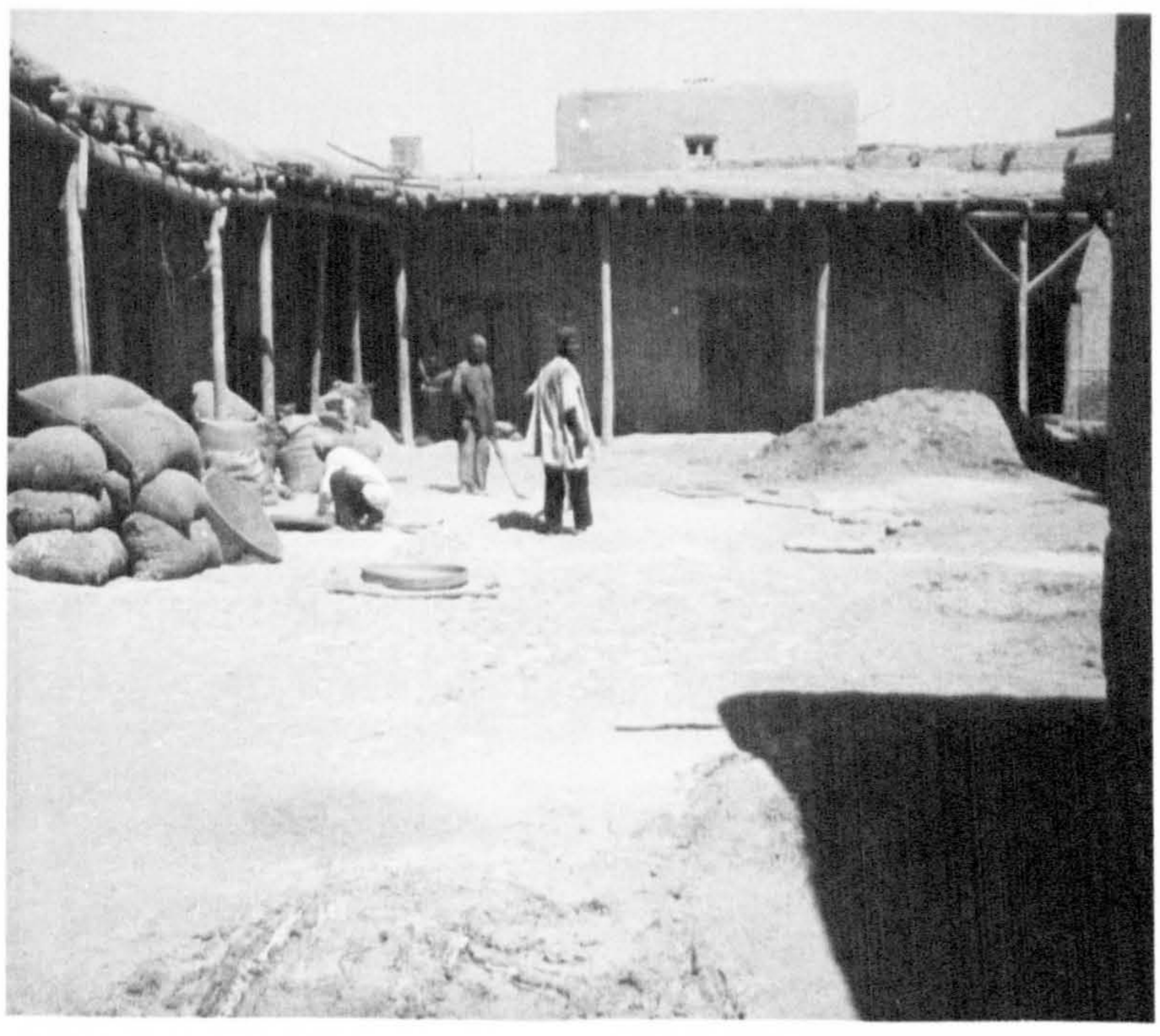


Plate 21. Land under speculation, formerly a garden. Located in the south - east of the city.

Plate 22.

Caravanserai with cereal merchants and millers, in Pain Khiaban.



gardens which are abandoned for cultivation at the point when the income that would be gained from letting the land for building purposes becomes greater than the income from gardening. The gardens are and were chiefly producers of raisin grapes,fruit and vegetables, and most of them were owned either by the richer families of the city, or by the Shrine. The importance of these gardens to the growth of the city (the provision of building space) is recorded in the street names area in the old town - names such as 'Chahar Bagh' (four gardens) 'Bagherabad' (garden place) and 'Bagh Rezvan'. Today the majority of the productive gardens [redacted] are located much further out of the city, having been displaced by the encroaching built up area.

6. Land under Speculation

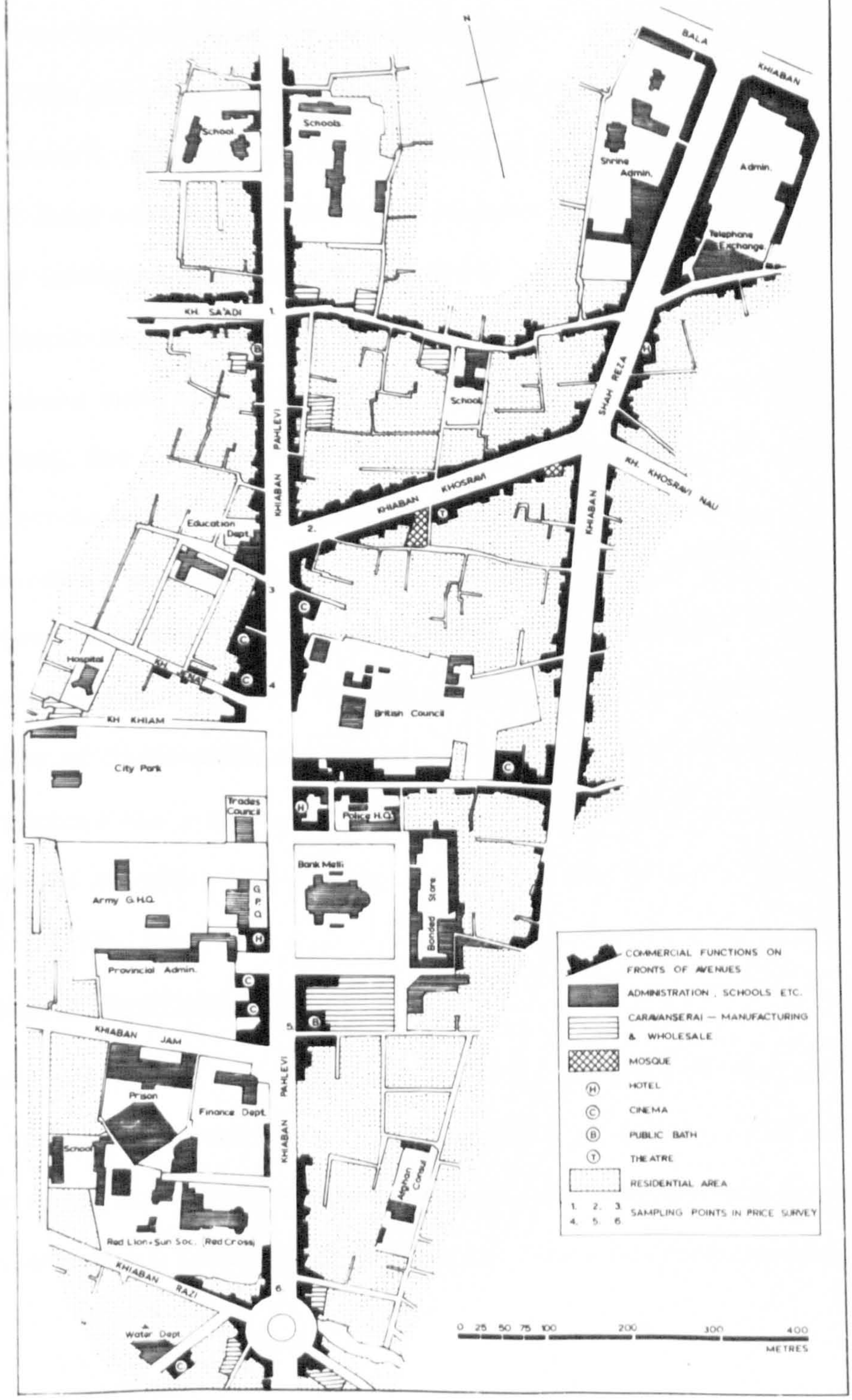
As the value of garden land rises, cropping ceases and the garden is sold or rented out to a developer, in whose hands it may remain unused for a period of months, or even years whilst its value continues to increase up to the point where the developer feels he can make a profit large enough to justify selling it, or building on it. Thus in the north-west of the city in particular, several of these gardens stand empty. (Plate 21)

7. Administration and Public Services

The administrative functions of the centralised nation set up by Reza Shah in 1920-30 were at first housed in the palaces, Arg (fortress) and town houses vacated by the ruling elite during Reza Shah's reforms.

Fig. 36.

MASHHAD – NEW CITY CENTRE – GENERALISED LAND USE



Though few city Args are left in Iran, their sites continue to excercise administrative, governmental and other central functions, much as they did in the centuries before Reza Shah. This applies in particular to the larger cities - Tehran, Tabriz , Shiraz (where the Arg still stands), functioning as a prison, and Isfahan. In Mashhad (Fig.36) many central functions are located on the former sites of the Arg including the Ostandari (office of the governor - general) Bank Melli (National Bank), Post Office, Police H.Q., Trades Council, former Customs house (now near the railway station), Treasury, General Staff H.Q., Prison, Red Lion and Sun Society (Red Cross) and others of less importance. Located elsewhere in the city, but still largely in the new town, are the municipality, in Meidan-e-Shah, at the north end of Kh. Pahlevi, and the Shrine Administration (Ostanegots) and telephone exchange on each side of Kh. Shah Reza, south of Balakhiaban, which is the site of Nadir-Shah's palace. Clinics, schools and hospitals are scattered through the residential areas, chiefly of the new town, with the large Shah Reza Hospital and Nemazi Nursing School in the south, at the western end of Kh. Bahar.

8. <u>Derelict and non-functioning areas</u>

As the city expands to the west, areas north and east of the Shrine are declining and becoming derelict, as seen under 1, above. This is particularly evident along Pain Khiaban (Fig.34) the eastern end of which consists of caravanserai formerly of industrial function where cereal

merchants and corn millers used to operate. (Plate 22) These are disused and abandoned, occupied from time to time only by the poorer pilgrims, who take rooms for short periods at low prices. (Plate 23) This decline is due partially to the fact that the area is in the 'twilight' zone, discussed above, but also to the fact that although Pain Khiaban was laid down to carry the main road to Tehran (as it probably did in the eighteenth century), this latter today leaves the city in the south east via Khiaban Bahar. Consequently Pain Khiaban has become a cul-de-sac to which access by motor transport is possible only via the congested roundabout at the Harram, or north off Khiaban Bahar, through the disused land east of the city. A new Khiaban, marked on the map (Fig.35) is being constructed along this route, somewhat belatedly (and seen in Plate 24,) and may possibly revive the caravanserai of Pain Khiaban - indeed a new, automated spinning factory has recently been established in one of the disused caravanserai by a German concern. Elsewhere in the city, decline is also in evidence, particularly in Bazar Sarshur (south of Bazar Bozorg, Fig.35) which is too narrow for motor transport, and has fallen into disuse as a result. (Plate 14)

3. CHANGES IN LAND USE

It would seem from observations of the land use classes so far discussed that the growth of Mashhad is not unlike the process of sequent occupance already well documented in many western cities. Functions are displaced outwards by others of a higher order which appear in the centre

Plate 23.

Caravanserai, used for pilgrim accom--odation, in Pain Khiaban.

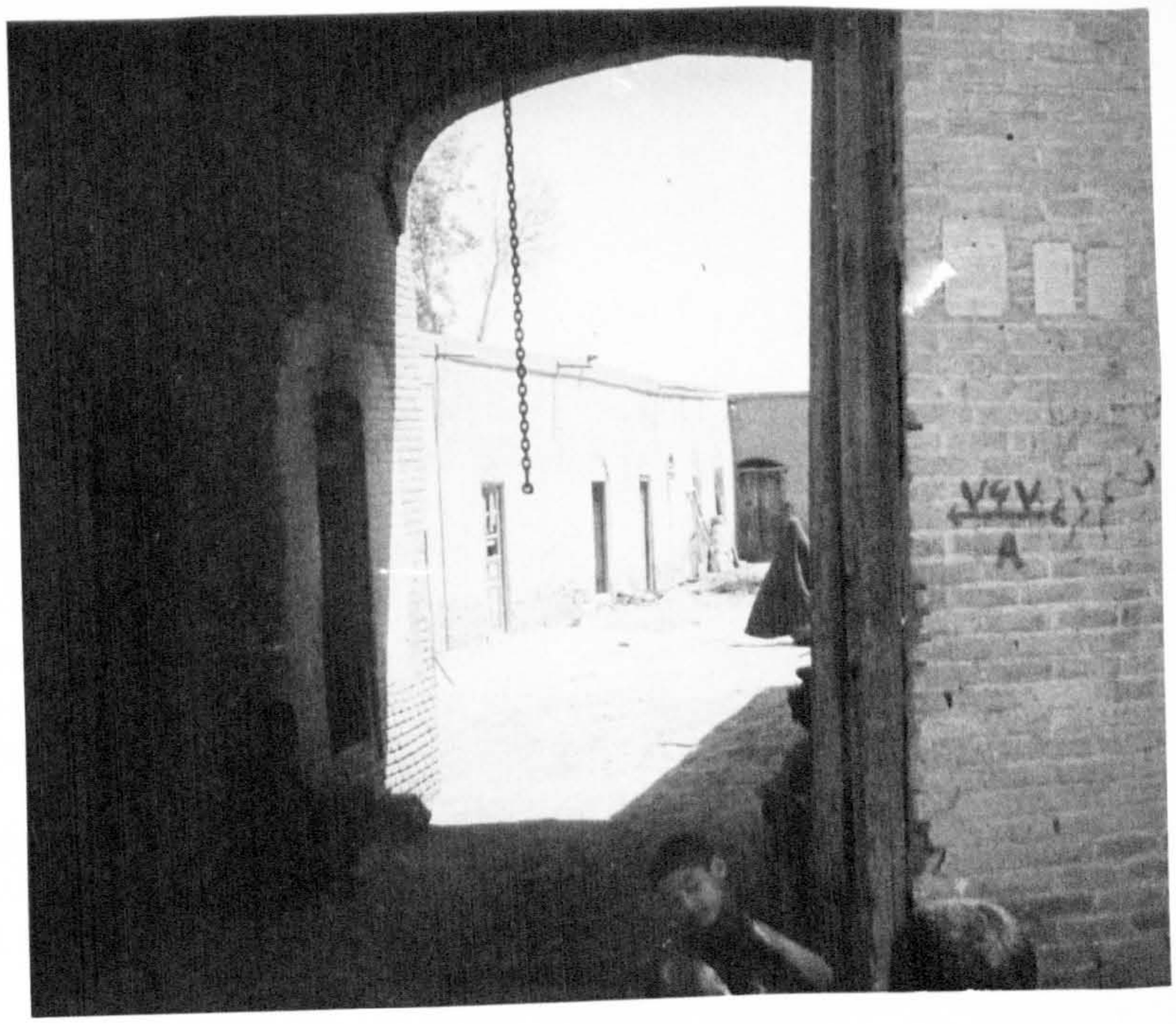


Plate 24. The new khiaban running south off Pain Khiaban.

of the city and which are able to withstand the high rents demanded for central locations, and to benefit from the congestion of the central areas.

Residential zones are obviously growing fast on the periphery of the city, particularly in the north, west and south, and as seen, these zones are housing two types of migrant - those moving directly to the city from rural areas, and those moving from the centre of the old town to its suburbs, where space for building is available in the former gardens and other agricultural land surrounding the city. The vacuum left behind by these latter families is filled partly by poor in-migrants occupying the 'twilight' zone north and east of the Harram, and partly by higher commercial functions, chiefly facilities for pilgrims, either in new or converted premises.

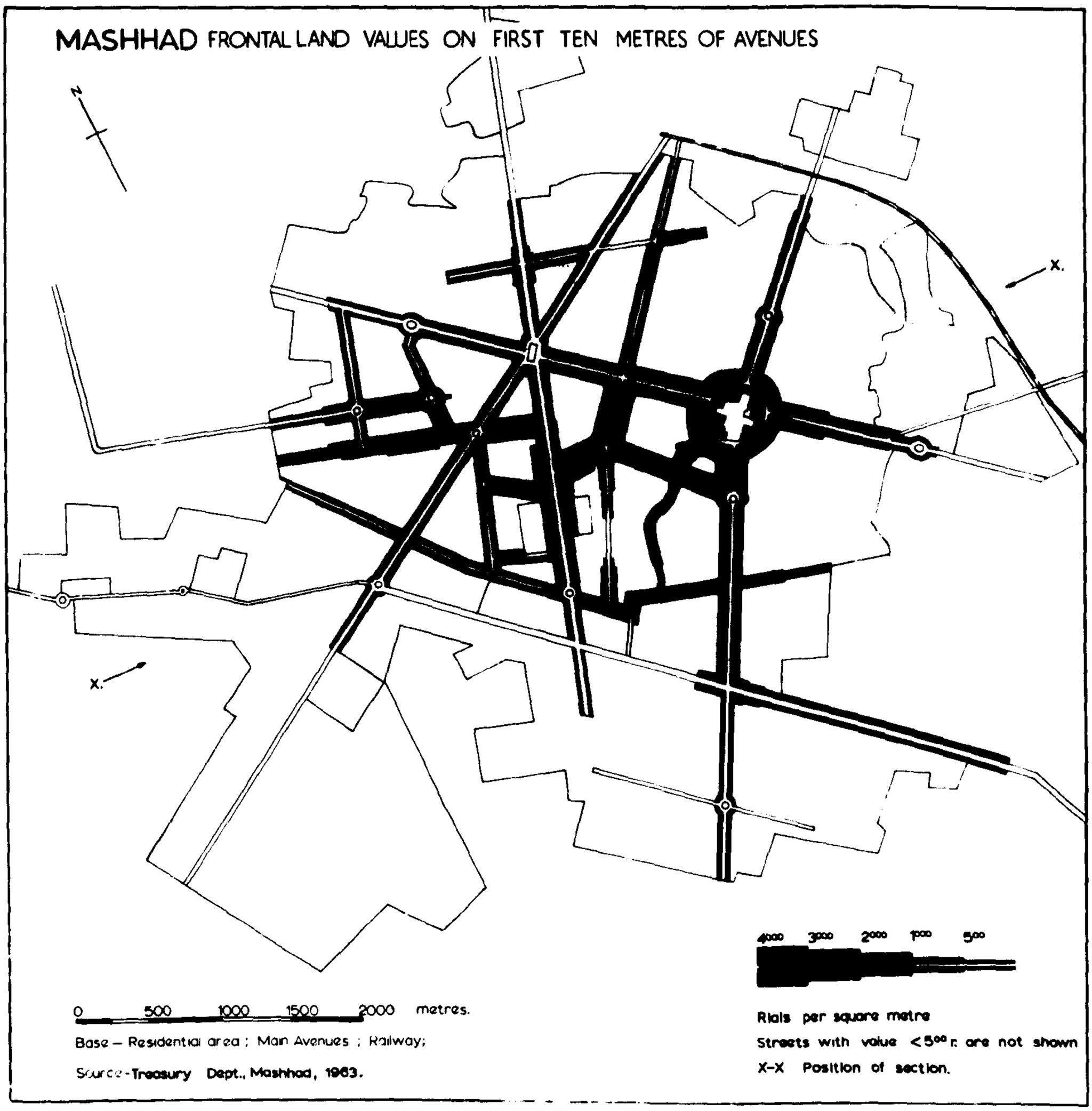
The growth of residential zones is displacing not only agricultural land use (gardens are now up to 12 Kms. from the city) but also the brick factories which have moved to their present position beyond the railway in search of lower land values and greater space. Disused clay quarries and old kilns now occupied by the very poor in shanties and caves are to be seen in the east of the city, inside the railway. Only one of these inner factories is still in production, and some of the derelict area is already being built on, for housing purposes (an extension of zone 5). The establishment of new, large factories on the periphery of the city, is also an aspect of this concentric development.

Within the city itself, there has occurred a great re-orientation of commercial, wholesaling, and industrial functions around roads capable of taking motor vehicles. This, plus the increasing demands on space which larger scale methods of production entail, has caused the wholesaling and producing functions to move out of the city, as noted above, to positions along major routes of access to Tehran and to the south of Khorasan. Caravanserai and other premises vacated by wholesaling and production are being converted into offices, hotels, lodging houses, and bus termini.

Growth to the west has involved the establishment of a western centre, based on the old Arg, in which many of the administrative functions of the city are located. This centre is also in a sense a product of the transport revolution which enabled the western extensions of the city to grow.

The sum of land use changes would seem to indicate that the process of growth in Mashhad is one of sequent occupance by successively higher order functions outwards in a roughly concentric fashion, modified by local factors such as the existence of routeways to which industry is attracted, and the growth of the new town centre. These changes are partially due to increasing pressure on land and the rise in land values, and partially to the replacement of the once-dominant vertical organisation of society by horizontal organisation in which class systems and functional specialisation have an increasingly important role to play.

Fig. 37.


MASHHAD FRONTAL LAND VALUES ON FIRST TEN METRES OF AVENUES
N
X.
X.
4000 3000 2000 1000 500
0 500 1000 1500 2000 metres.
Base – Residential area ; Main Avenues ; Railway;
Source - Treasury Dept., Mashhad, 1963.
Rials per square metre
Streets with value <500 r. are not shown
X–X Position of section.

4. LAND VALUES

A. Introduction

When considering the land values in a city, it is convenient to divide the topic into two sections - the value of land on the fronts of the main avenues, and the value of land in the interior of the blocks circumscribed by these avenues. These two divisions are by no means arbitary, since it is almost always the case that frontal values are higher than interior ones, due to their greater accessibility. Indeed the value of land in an urban area can be viewed in terms of relative accessibility with which it has (in the western world) a direct relationship.[5] As accessibility decreases in two directions - from the centre of the city outwards, and from the fronts of avenues into the blocks, so land values decrease with it. In reality, this simple generalisation is usually modified by the demands of different functions for particular sites, and by the possibility of the existence at any site of alternative, competing functions.

B. Value of Land on the Fronts of Avenues (Fig.37)

Two maps of land values have been prepared for Mashhad (Figs.37 and 38) The map of 'Land Values on the first ten metres of main avenues' was based on statistics provided by the Treasury Department at Mashhad. The treasury exacts a tax on the sale of all urban land which is fixed at 24% of the difference between the price when the land was last sold, and its present price. This is an attempt to gather into the public sector some of the increases in land prices. The values given are based on actual sales during the previous five years, expressed at 1962 prices, and where sales were not

recorded, estimates were made by the treasury. The values are not always a true representation of the price of the land on the market. A lower limit of 500 Rials per square metre has been set to exclude the consideration of many minor roads and kutches. The map reveals several main points:-

(i) There are two central areas of high land values (above 3000 rials per sq. m.) - the Harram and in particular the south western section of the roundabout, intersected by the main bazar, Bazar Bozorg; and in the new town, the cross-roads of Kh. Pahlevi and Kh. Khosravi, situated north of the old Arg area. These two nucleii differ greatly in structure. The area around the Harram has a land use pattern which still bears evidence of the older vertical structure of economic organisation. Despite high land values, production and wholesaling are still carried on, whilst there still exist bazars devoted to one product such as carpets or shoes, within which a number of different functions are carried out.(Fig.35) The Pahlevi-Khosravi nucleus on the other hand is a product of more recent, horizontal organisation, and there are few producers or wholesalers, and only three caravanserai in the area. Functions represented such as retailing and services are those of a higher order which can support the payment of high rents, and the nucleus has at least the superficial appearance of a western 'central business district', though on a small scale (Fig.36)

(ii) The next highest land values are to be found on the roads connecting the two nucleii, a situation which has its explanation in historical terms. In the past the two main centres of most Persian cities were the cathedral Mosque (Masjid-e-Jome) and the Arg,[6] and as we have seen, in Mashhad, the two town centres are in these same positions today. Moreover, it was

also the case in the past that the main commercial streets or bazars were those connecting mosque to Arg-in the case of Mashhad, Kutche Arg, and Bazar Bozorg with its southern continuation Bazar Sarshur. (Plate 14) Today this Mosque-Arg connection is still the most important commercial axis of the city, but due to the advent of the motor vehicle, it is now re-aligned along the wide avenues connecting the Harram to the former Arg. These avenues are thus Kh. Pahlevi, Kh. Khosravi, Kh. Shah Reza, and Balakhiaban to the Harram. Basically then, the main pattern remains unchanged in the centre of the city, except that the new town centre now has much more importance than did the Arg which preceded it, and the old town centre is now less important than formerly. The old bazars of Sarshur and Kutche Arg have declined functionally and some of the disused commercial premises along them are being converted into residences,[7] whilst the new avenues with their ease of access have grown in commercial importance.

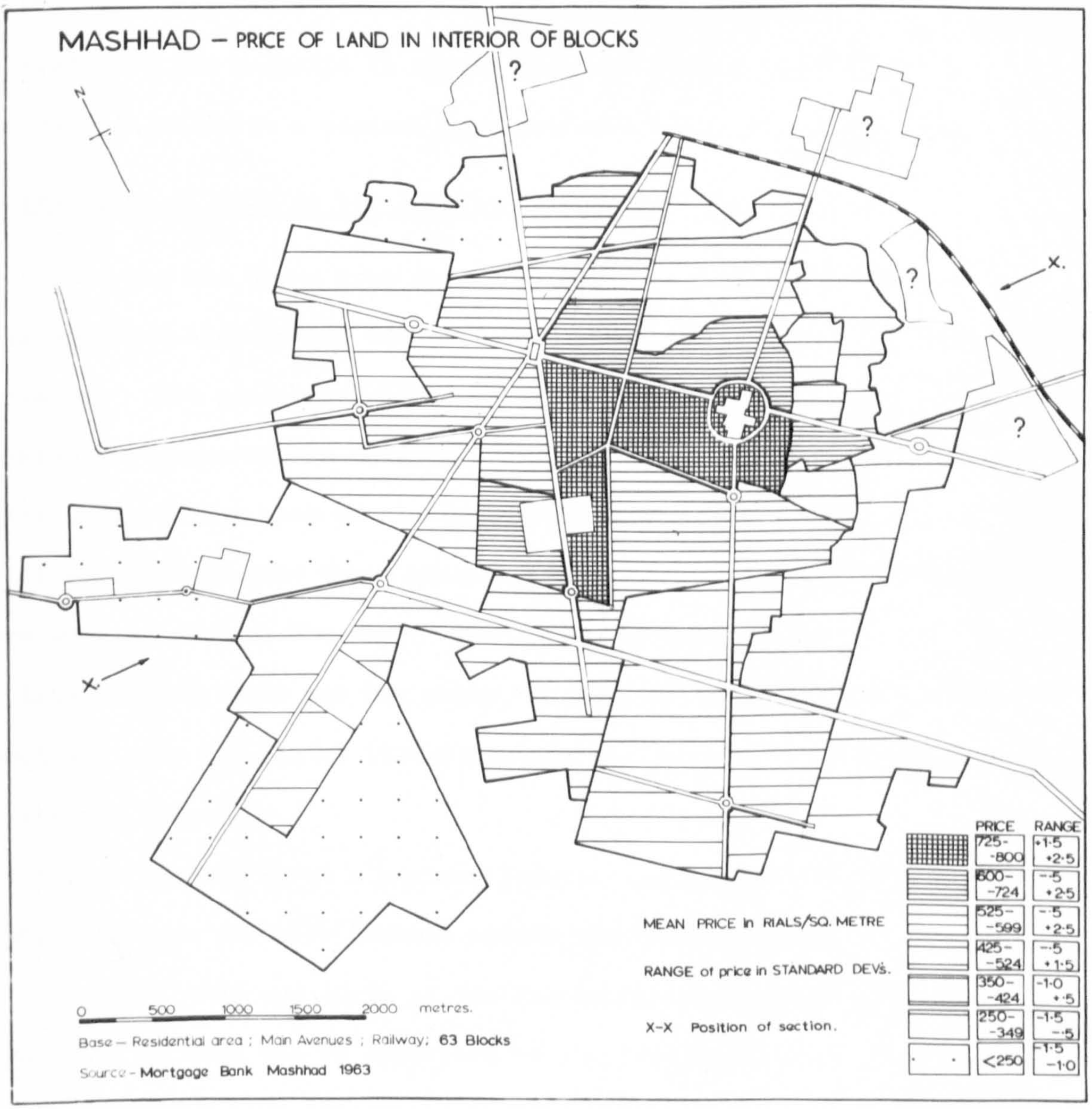
(iii) Certain avenues which have few commercial premises along them have, nonetheless frontal values in excess of 500 rials per sq. metre. These are the grid-iron pattern avenues of the higher class residential suburbs in the west (Fig.37). Here,because the rectangular blocks are large in size there exists only limited access to their interiors (often not wide enough for motor vehicles) and the frontal site, even for residential purposes has a much higher value. Vielle observes a similar situation in some of Tehran's newer residential zones.[8] In contrast, the older residential zones of the city are served by the Kutche

system which provides access of a very low order (no vehicular access) to all parts of the zones, and frontal values cannot be distinguished from interior values except on main avenues which are almost wholly commercialised.

C. Sargofli, or Key money

The sargofli is a sum of money paid by an entrepeneur for the site value of a shop, it is a price charged in addition to the value of the building or the land. Indeed it is often the case that both land and buildings are rented from the Shrine, or a private owner, and rarely change hands. The size of the sargofli depends largely on the site value of the shop, and only secondarily on its physical size (usually charged to rent) and the product dealt in, the function carried out, and the value of the customs built up by the seller. It is thus a price subject to all the pressures of a free market, in terms of demand and supply of existing sites, a sensitive measurement which reacts to even small changes in the state of the market. For this reason a survey of sargofli is difficult, since the price of the sargofli is known only when a premises changes hands. Assessments of site value by merchants in the bazar, with extensive cross-checking indicates that sargofli can vary a great deal in amount over short distances. In the Bazar Bozorg shops in the main section have a sargofli value of up to 100,000 rials, and many are 50,000 rials, yet a few metres off this main part, in a narrow alley, part of the shoe bazar, sargofli are as low as 10,000 rials. Thus whilst the pattern of sargofli is similar to that of frontal land values, it is a measurement of site value which is more

Fig. 38.


MASHHAD – PRICE OF LAND IN INTERIOR OF BLOCKS
N
?
?
?
?
X
X
0 500 1000 1500 2000 metres.
Base – Residential area ; Main Avenues ; Railway; 63 Blocks
Source - Mortgage Bank Mashhad 1963
MEAN PRICE in RIALS/SQ. METRE
RANGE of price in STANDARD DEVs.
X–X Position of section.
PRICE RANGE
725- -800 +1·5 +2·5
600- -724 -·5 +2·5
525- -599 -·5 +2·5
425- -524 -·5 +1·5
350- -424 -1·0 +·5
250- -349 -1·5 -·5
<250 -1·5 -1·0

sensitive to site variations. Values of sargofli are keenly watched by owners of businesses in central areas and the outcome of a change of ownership is of vital importance to the value of neighbouring premises. Outside the central area the sargofli is rarely high and indeed in peripheral zones of the city it falls to a nominal payment-for a house site for instance.

D. <u>The Price of Land in the Interior of blocks</u> (Fig.38)

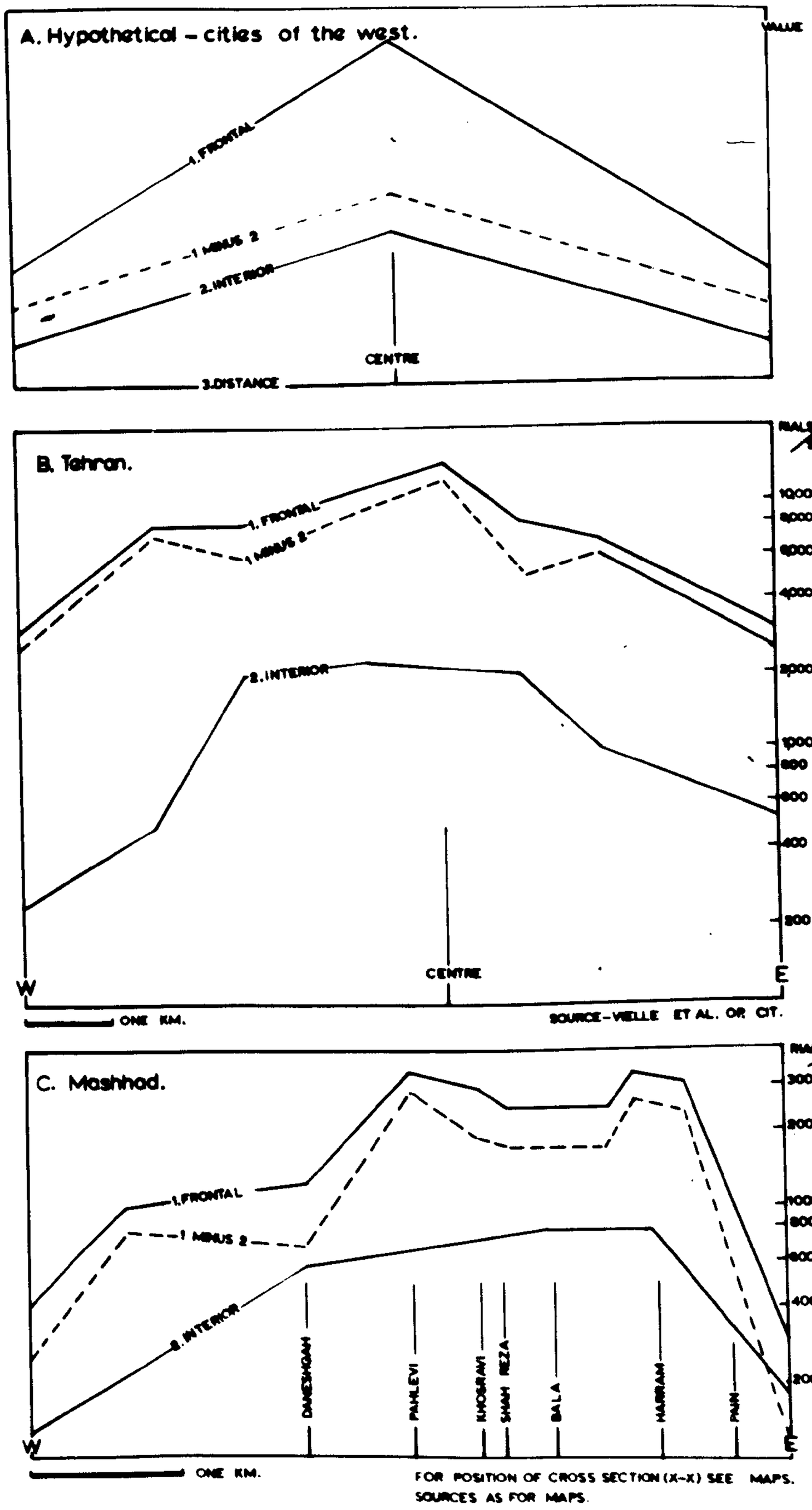
This map was drawn from data provided by the Mortgage Bank whose main interest lies in the value of land-sites and property for residential purposes. The prices are based on the actual transactions of clients seeking mortgages and on estimates of price, for 1961-62. A range of price is given for each of the 63 major blocks in the city, the mean values of which, grouped into seven classes based on the actual frequency distribution, were used to draw up the map. The variation expressed by the standard deviations (106 rials per sq; metre) is that of the whole range of prices about the city mean price (470 rials per sq. metre). The major features of the map are:-

(i) Prices tend to be at a maximum between the two nucleii whereas in the past, they were probably highest around the Harram itself.

(ii) The area east and north of the Harram has declining values and lower prices and as seen can be described as the 'twilight' zone of the city, the origins of which have already been discussed. This area of decline is tending to grow in size and move westwards towards the Harram as the centre of highest land values also moves west. Thus the city grows towards the west, and as it does so, declines in the east.

Urban land values — relationship between 1. Frontal values
2. Interior values
3. Distance from city centre

Fig. 39.



(iii) Prices, as postulated would seem to decline with distance from the 'centre' of the city (a point mid-way between the two nucleii) but do so much more swiftly to the east than to the west, partially as a result of (ii) above.

E. Cross-Sectional comparisons of Frontal and Interior Values

If urban land values are, as postulated by Turvey[9] related directly to relative accessibility in a city, then in general terms, both frontal and interior values (and the difference between them) will increase towards the centre of the city, the frontal values at a faster rate than the interior ones, and this would seem to be the case at least in the western world (Fig.39.A.) In Tehran, Vielle et al.[10] found a modified form of this relationship (Fig.39.B.) Here an east-west cross section of the city, generalised from mean land values, shows that the greatest difference between frontal and interior values is at the centre of the city, where frontal values are high, but where congestion and difficulties of access reduce the value of interior sites. The two minimum difference points are in the interior residential zones of the city, where as pointed out for Mashhad, the kutche system allows roughly equivalent access of a low order to all parts of such zones. After these points, the difference between frontal and interior values rises again in the new suburbs of Tehran where the net-work of secondary roads is not so comprehensive and blocks are larger so that sites on main roads have greater access and value.

The available data for Mashhad are not comprehensive ehough to allow an accurate cross section to be drawn, but generally the east-west section is probably similar to Fig.39.C. Here the frontal values show twin

maxima corresponding to (and in part defining) the city's twin nucleii - the Harram, and the Pahlevi-Khosravi cross roads. To the west, frontal values remain fairly high in the rectangular planned suburbs, but to the east, they fall off quickly as such suburbs are more rare and Pain Khiaban (the main avenue) is a cul-de-sac of limited access where land values are relatively low. There is also a fall in frontal values between the two nucleii. Interior values on the other hand increase steadily to a point east of the mid-distance between the two nucleii, and then fall off quickly east wards. The difference betweeen frontal and interior values is thus low between the two nucleii, rises in them, and then declines again outside of them in the inner residential zones as in Tehran. West of this the difference increases again in the suburbs, whilst to the east where such suburbs are absent, the difference between frontal and interior values continues to decline.

5. SUMMARY

In Mashhad, as more generally in urban Iran it would appear that two great changes are taking place. Firstly, society is changing from a dominantly vertically organised structure characterised by clan and kin systems, to one of horizontal organisation based on class. Secondly, and partially dependent upon this, the economy is also changing from a vertical structure of specialisation by product to a horizontal structure of specialisation by function. In both cases functional specificity replaces functional diffuseness.

These two major upheavals have a surface expression in the distribution

of land use and land values in Mashhad, and as the city grows those parts of the distribution based on the old vertical structure tend to be replaced by those features which are a product of horizontal organisation. Residential areas are thus increasingly characterised by a particular income and social class, and in industry and commerce, location is increasingly based on functions, with their specific spatial and rental demands and less so on product groups. In both cases, social and economic, it would appear that the old town laggs behind the new town and evidence of vertical organisation is still plentiful in the mixed-class residential areas of the old town, and in the bazars and caravanserai devoted to a particular product without regard to function, in the old town centre.

Superimposed on this changing pattern of land use is the phenomenon of sequent occupance and displacement outwards of lower order functions by those of higher order. The distribution of land values, frontal and interior indicates the emergence of twin nucleii in the city, and in general conforms to thehypothesis that land values are related directly to relative accessibility. As the 'centre of gravity' of the city moves west towards the new nucleus, so does the eastern zone of dereliction and declining value. Further growth to the west, and possibly the north is likely to take place, whilst the extent to which eastern decline spreads will be controlled by the future importance of the Harram. If [redacted] religion were to become less important in Iranian society, the Harram and the centrality which it confers on the area around it might also decline, and the new town centre would in this case become more dominant as it is perhaps today, in Tehran.

Notes to text and references

1. Talcott Parsons 'The social system'. Glencoe. Ill. U.S.A. 1951.. and other writings

2. durushki = horse carriage. Probably derived from the Russian 'drosky'

3. Gibb, H.A.R. and Bowen H.'Islamic society and the west' pub. Royal Inst. of Int. Affairs. London 1950. Chapter IV.

4. ibid , loc.cit.

5. Turvey, R. 'The economics of real property' London, 1957

6. Pope, A.U. and Banduin, E.E. 'City Plans'in Pope A.U. (ed). A survey of Persian Art, vol. II p.1397. London.

7. Dealt with in chapter 11.

8. Vielle et allii. 'Tehran, les prix, le marche des terraines et la societe urbaine'. Section de sociologie Urbaine, Institut d'Etudes et des Researches Sociales, University de Tehran. Tehran 1961, mimeo.Annexe du chapter I. p.97.

9. Turvey op.cit. p.

10. Vielle op.cit. loc. cit.

15. ORGANISATION OF THE BAZAR IN THE PAST

1. Introduction

2. Model of a bazar economy

   (a) assumptions

   (b) process of exchange

   (c) dynamics of the model

   (d) the guild system

   (e) summary and conclusion

3. Implications for the general hypothesis

1. INTRODUCTION

The distribution of land uses, and their relationship to land values has been described in general terms. It remains now to attempt an explanation of how such a pattern emerges as the city grows, and to look in detail at the economic organisation of the city which is both a cause and an effect of the land use and land value structure.

It has been shown that the organisation of enterprises in product groups located in bazars originated in the former tribal organisation of society which was characterised by vertical structure. Each sub-tribe specialised in a particular product and these specialisms became established in the urban fabric as cities such as Mashhad grew, so that the bazar or suq is now a common feature of cities of India, Pakistan, Central Asia, and the Middle East. Distinctions between functions such as retailing, producing or wholesaling both in organisation and location, were much less important than distinctions between product groups - carpets, shoes, copperware, each of which had its own bazar. Once established, the bazar system tended to maintain itself, partially because shops within a bazar become mutually inter-dependent and needed close contact to survive - an economic necessity which was reinforced by the strength of the guilds associated with each product group.

A characteristic feature of industrial and to some extent commercial enterprise was (and in part still is) the small scale of individual enterprises many of which were one man businesses. Due to low levels of productivity in a developing economy such as that of Iran, there was (before

the discovery of oil) a severely limited amount of capital available for investment. Moreover, due to the prevailing conditions of economic, military and political insecurity, the little capital that was invested was placed in land, or in foreign countries of great security. Even today liquid capital is still in short supply and interest rates are commonly 12%, and as much as 25%. Under these conditions expansion of a business was very difficult, and enterprises were so commonly small, that 'smallness' was given institutional form in the guild system, which in many ways discouraged expansion.

Much of what has been said no longer applies today as modern influences which collectively go under the term 'development' affect the economic and social structure of the city. In order to fully appreciate the present situation in land use, already described, and in economic organisation, yet to be dealt with, it would be a great advantage to have an idea of the situation as it was (say) in the eighteenth and nineteenth centuries, before modern and western influences were felt. Data which could allow this are however not in existence, and so as a substitute a model of a bazar economy has been constructed describing the steady state which, it is hypothesised, is close to the situation that existed in the past.[1] This model provides a background against which to assess the present situation, details of which are dealt with in Chapter 16.

2. MODEL OF A BAZAR ECONOMY

The term 'bazar' is now in wide use, but its meaning and usage are extremely vague. Some writers have used the term to describe what they see as a morphological phenomenon found in Middle Eastern cities, others to

describe a specialised type of economic organisation found only in certain regions of the world such as the Middle East. Explanations of how the bazar works have rarely been given however. Here the bazar is defined as a collection of commercial and economic functions located at a central point in the city, and some attempt is made to explain how this functioned in the past in Mashhad. A model was constructed based on observations of activities taking place in the bazar today, and was limited in scope by a set of rigid assumptions which are thought to exclude complexities caused by response to modern developments and technological changes. It is not entirely theoretical in that it is based on a substantial period of observations and interviewing in the city of Mashhad.

A. Assumptions

1. The bazar is made up of producer-retailers only, whatever the product dealt in. This type of unit is thought to have been the most common in the history of Mashhad, being replaced and added to only recently by specialist producers or retailers as modern influences mold the economic organisation of the city. Each unit is therefore an independent enterprise producing the same type of product as its neighbour.

2. Both retailer and customer are attempting to maximise the outcome of each sale. If a transaction is completed it is assumed to indicate satisfaction on both sides.

3. Each producer-retailer is of small size, and none are dominantly large. It has been observed in present day Mashhad that in some industries no producer-retailer establishment has more than a total of three employees, and half of all establishments in Mashhad today are one-man businesses. Each has also only limited capital.

6. Each establishment has equal access to the total market, for they are all located in the central bazar of the city. This is not unrealistic, even today there are for example only 25.2% of the carpet sellers located outside the carpet bazars.

B. The Process of Exchange

Exchange in the bazars of Middle Eastern cities was (and in some cases still is) by the bargaining method. In the absence of standard quantities, weights and measures, and with no control over quality, assessments of value have to be made at a personal level, and no two items are alike. Under such conditions, the potential buyer must assess the value of the particular goods for himself and try to obtain them at a price lower than this estimate. Equally the seller must estimate the value of his product to that particular customer and with due regard to his costs, demand a price higher than this estimate. In reality much depends on the personality of the buyer, or seller, but in the model we are dealing with the 'average' buyer or seller , who represents the whole collection of persons who are making such a transaction in the bazars. Many variables are involved in such a transaction and so it was decided to look in detail at those which seem to contribute to the eventual price. The variables are each given a symbol, so that their relationships can be stated unambiguously in equation form. (Table 41)

Table 41

Reference list of terms used:-

M	=	average income
U	=	utility
Y	=	seller's estimate

Table 41 (contd..)

Reference list of terms used:-

C	=	costs
X	=	number of consumers
K	=	proportion of M.U. for buyer's minimum offer
S	=	proportion of Y for seller's maximum demand
E	=	seller's demand
L	=	buyer's offer
D	=	minimum unit of increase for buyer
F	=	minimum unit of decrease for seller
N	=	number of producer/retailer establishments
n. n max. n. min	=	referring to number of goods

The buyer$'s estimate would seem to be a product of their personal scale of preferences which for the average buyer is utility - U, and income- M. In general the scale of utilities will vary for a given good, in iverse proportion to income. As we have seen in chapter 12 that part of the urban population of Iran with higher incomes has expenditures beyond the reach of the lower income group and the scale of utilities is thus stretched. For a man earning (say) £500 per annum, the utility of one pair of shoes is much lower than for a man earning £100 per annum. The former is willing to pay a smaller proportion of a larger income, the latter a larger proportion of a smaller income, for a similar product. Estimates of value of products available to both will then be roughly equivalent at ..... (M.U)

The buyer's first offer will be some fraction of his estimate of value for he is trying to obtain the goods as cheaply as possible. This can be ...L = K (M.U.)

The seller already has an estimate of the value of the product in terms of his cost of production (C) and he has also a limited experience of the market based on prices in the past. However he is trying to maximise his profit on each individual sale, not sales over a period (illiteracy prevents book-keeping and with it any notion of long term maximisation and short term loss). His estimate of the value of the goods to each particular customer is therefore a product of all these considerations and can be represented as ...Y = f(K(M.U) + C, whre f is an unknown function which is a dependent variable. His first demand will be higher than this estimate since he is attempting to obtain as much as possible for the product.. E = Sf (K(M.U) + C, S is thus a constant of value greater than one, which can cycle with the other variables after the first demand, since it is a 'feed-back' source of information the value of which depends on its previous values. It represents the sellers' knowledge of previous transactions. Costs (C) are a constant for the model though the value of the constant can of course be varied independently.

The seller's demands are however limited in scope by certain other criteria. There is a minimum price below which the seller cannot go, where the consumer's maximum offer is below or equal to his costs of production - where ... K(M.U)$\leqslant$C. This minimum price is constant for all shops in the bazar since sales at prices lower than this would lead to a direct loss on each sale. An equally restrictive maximum price is also operative in these conditions, where a slight increase in price by one seller (expressed in terms of driving too hard a bargain) would soon divert all sales to his adjacent competitors.

Moreover each unit has a limited productive capacity, proscribed by the amount of work which any 1-3 men can do by hand in one day. Due to this there is no possibility of making more income through lowering the price of the product below that of neighbouring shops in order to increase sales. The extra sales brought forth by such a drop in price would soon reach the level of the limited productive capacity - in other words the shop would be selling very few extra goods but would be losing income on each sale[2]. This limited producing capacity ('n.max') thus means that any decrease in price below the general level of prices in the bazar can only lead to a loss of income for the establishment concerned. It is a situation in which undercutting cannot take place, an economic state in which the margins of profit and loss are so narrow and the enterprises so small and relatively numerous, that no single producer-retailer can affect the market by any policy of his own. All enterprises must therefore maximise their profits in terms of each unit sold - a state of near-perfect competition, in which the bargaining method of exchange plays an important part.

As the bargaining process continues, the buyer's offer rises to meet the descending demands of the seller, but these movements are observed to take place at a decreasing rate as the buyer's estimate of value, (M.U), and the seller's estimate of that estimate, f (K(M.U) + C, are reached. The rate of increase for the buyer is a function of the difference between his estimate of the value of the product (which is also the maximum price he can rise to) and the size of his first offer, that is....D = f(M.U)-K(M.U).

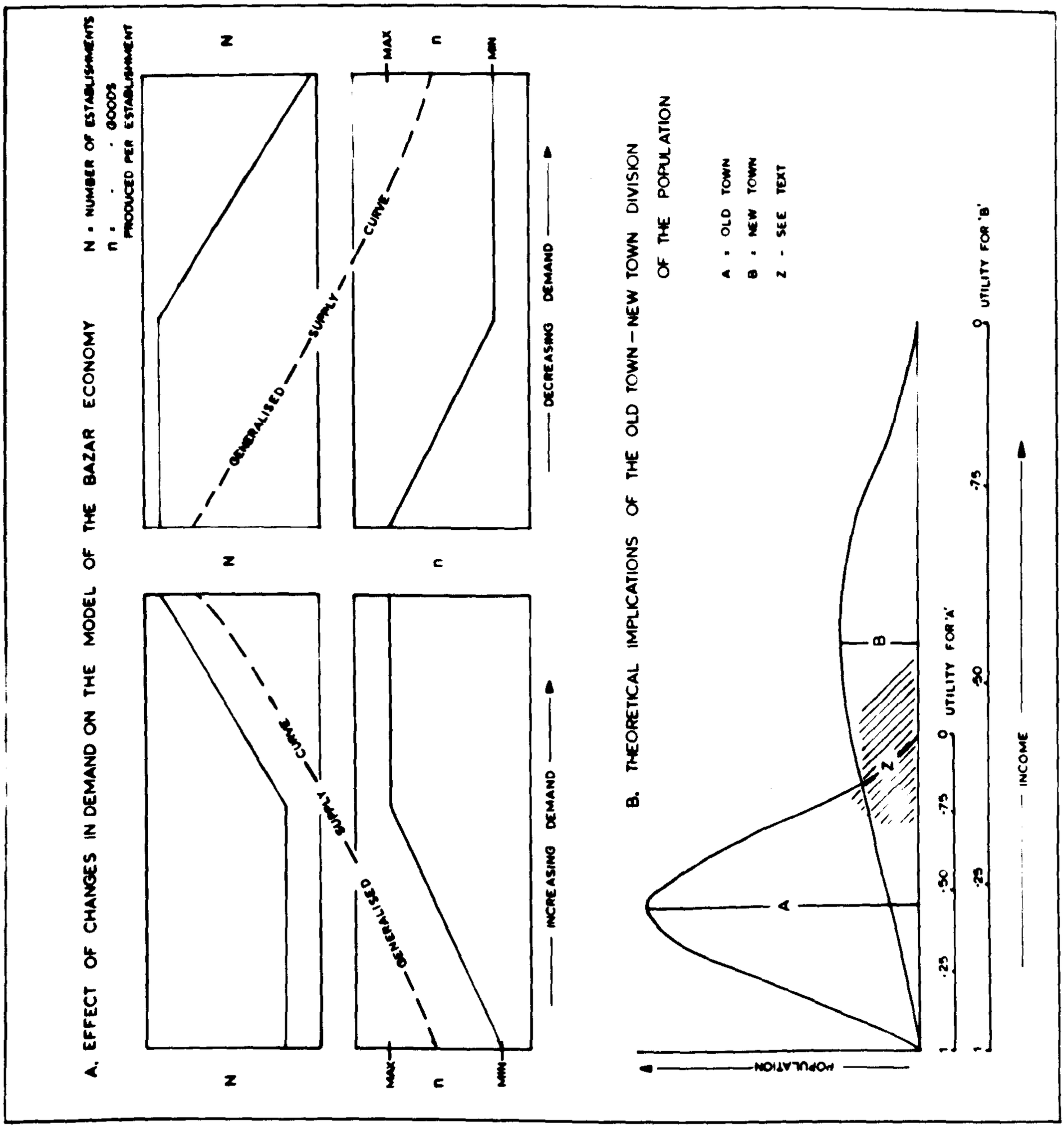
Similarly the rate of decrease for the seller's demands is a function of the difference between his highest (first) demand, and his minimum possible demand.... F = f(Sf(K M.U) + C)-C. These two rates of increase and decrease decline as the price of the transaction is approached, and in the model are limited to an eventual constant (for both buyer and seller) which is dependent on the total quantities of money involved. In a bargain for bread this final constant might be one rial, for a car it could be a unit of perhaps 1,000 rials.

Supply and demand have so far been considered only in an indirect sense, but it is useful to express them in terms so far used, to facilitate explanation later. Demand in the city as a whole can be viewed simply as a product of average income, average utility (scale of preference) and the total number of consumers...(M.U.X.), and this can be used to describe demand for any part of the city's population, as for instance that of the new town, or the old town, in which the three components will stand in a different relationship each to another. Supply is regarded here simply as the number of goods produced per unit 'n'(with 'n.min'. and 'n.max' as the limits) multiplied by the number of enterprises producing...(N).

C. Dynamics of the Model

Attempts were made to simulate the model on an Eliot 803 computer so that by giving the variables some arbitrary values, changes in the system as a response for instance to increasing real income, or different supply conditions, might be plotted. The output was programmed to give the

Fig. 40.


A. EFFECT OF CHANGES IN DEMAND ON THE MODEL OF THE BAZAR ECONOMY
N = NUMBER OF ESTABLISHMENTS
n = . . . GOODS PRODUCED PER ESTABLISHMENT
N
n
MAX
MIN
GENERALISED SUPPLY CURVE
DEMAND
DECREASING DEMAND
INCREASING DEMAND
B. THEORETICAL IMPLICATIONS OF THE OLD TOWN – NEW TOWN DIVISION OF THE POPULATION
A = OLD TOWN
B = NEW TOWN
Z = SEE TEXT
UTILITY FOR 'A'
UTILITY FOR 'B'
INCOME
POPULATION
.75
.50
.25
0
90

values of N,n,U, and price of transaction only. These attempts were not successful however and details are not discussed here. On the other hand the exercise did enable some of the implications of the model to be more clearly stated. These, representing the economy as it might have been, are discussed below.

Changes in the level of demand are of great importance and cause certain characteristic responses in the model. An increase or a decrease in demand can of course take place as a result of any change in the relationship of the three variables (M, U, X,) by which it is defined. If for instance the total amount of consumers, X, were to grow, or the real income, M, to increase what would the effect be on the bazar?

As demand increases, each establishment will begin to sell more ('N' for each will grow in value) up to a point where 'n max' is reached, which is the maximum number of goods any one producer-retailer can make per unit time. After this any further expansion of supply can be envisaged only in terms of the second variable, N - that is, an increase in the number of establishments in the bazar, (Fig.40,A). Alternatively as demand decreases, because no single producer- retailer has any competitive advantage over another 'n' will decrease throughout the bazar at the same rate for each establishment. Whilst the number of goods being produced can remain constant for a short period (since in practice each establishment lives in the continued hope of an amelioration in the situation), sales are decreasing, and an increasing amount of capital

becomes locked up in unsold products which are becoming daily of less value[3]. If demand continues to decrease, 'n' will eventually reach 'n.min', at approximately the same time for all establishments, at which point the price received is equal to or less than the cost of the product- $K(M.U) \leq C$; and the turnover is so low that the amount of income generated is not enough to meet the costs (C) of buying raw materials to produce another article. Thus below 'n.min' the producer-retailer cannot survive, and the variable 'N' (the number of establishments) will begin to decrease until supply is cut down to meet the low level of demand, and thus attain an equilibrium again, (Fig.40,A). In theory all establishments would cease business at the same time, but in practice the small differences between them, and as we shall see, the existence of the guild system prevented this.

This response to changes in demand arises from the fact that the establishments in the bazar are of small size, operating in a state of near perfect competition, and that for reasons outlined, capital is scarce and rates of interest prohibitive to expansion of a small business. For this reason 'n' can only be expanded to 'n. max'. On the other hand, since establishments are so small, it take little capital for a new one to be set up, entering the market at a level competitive with those already established in the bazar. This supply (in theory) can respond to movements by changes in the number of establishments, N.

D. The Guild System

The working of the bazar has so far been considered only in terms of

economic variables. In reality however, other, non-economic factors were important in the economic organisation of Mashhad, the chief one being the influence of the guild system, which was, in the opinion of Gibb and Bowen at least partially responsible for the static nature of the economy in Muslim cities of the past.[4]

The guilds or 'asnaf' of Arab cities were usually aligned vertically, that is by product, but divided horizontally into masters, journeymen and apprentices, under the 'seyh' of head[5]. Only masters who had had a certain period of training were allowed to operate a business, and the right to do so, the 'gedik' had to be purchased from another master or else it was inherited. Few new gedik were created by the Treasury, and it was usually much easier to purchase an old gedik than to buy a new one. Guild activites were rigidly controlled and the initiative allowed to members was small. Fixed maximum prices were common, as well as control over design, and sometimes quality. Innovations were discouraged. In addition to their economic functions, most asnaf had other activities such as complex initiation ceremonies for apprentices, and mystical orders, and they were normally associated with the Islamic religion. Veneration of the first three Shia' Imams was a common factor even to Sunni guilds, and so when secularisation eventually took place during the eighteenth century it is probable that Mashhad's guilds maintained their religious attachments since Shi'ism was so powerful in the city. Some asnaf were more active than others, and in addition to an elected council and head also had co-operative finance and insurance schemes, built up by weekly subscription. Almost all had some members in the Janisserie (police force)

whose head was also normally a guild member; in eighteenth century Baghdad all guildsmen were also soldiers. The guilds had a large degree of autonomy, and almost all trades, down to prostitutes and thieves were organised on a guild system. Hostility to central authority was traditional, and examples are common of guilds being founded primarily to resist such authority in its quest to control the bazars. Even as late as 1926 Iran was held to ransom by the 'bazari' of Tehran who threatened economic paralysis should their political demands not be satisfied. By the end of the eighteenth century, guilds were becoming reactionary rather than radical and resistance to technical and organisational innovation was one cause of industrial decline in the cities of the Middle East.[6]

The egocentric character of the guilds was in part, it would seem, moulded by the economic conditions of the bazar, and reciprocally it had an influence over economic activity in the bazar. The model indicated that response to changes in demand could be met by changes in the number of shops in the bazar variable N. However the existence of the gedik system may well have restricted this. As demand rose the number of shops that could enter the market was limited by the number of gedik available in that product. It is probable however that in conditions of normal demand there were many 'spare' gedik, owned by non-practising masters who could sell them when demand called for an expansion of production. The gedik were too valuable to be allowed to lapse, even in times of low demand. On the other hand, as demand fell, co-operative insurance and finance schemes operated by the guild would protect the producer-retailers who were members of it, helping even the inefficient to stay in business, so that 'N' would tend to remain at a high

level even in slump conditions, as in Fig.40,A, when sales are approaching 'n.min'. Finally the guild was a force discouraging expansion even when capital was available - in the co-operative it was preferable that all shares were roughly of equal size.

E. Summary and Conclusion

The situation outlined above is dominated by a chronic 'smallness' in its activities, in the amounts of capital available, and in the amount of goods that it was possible to produce per unit of time. Expansion of an enterprise was not totally impossible but would tend not to occur due to the lack of available capital and the strength of the guild system, as well as economic congestion and the lack of education which dominated the cultural environment. Economically a system of near perfect competition, the bazar became under the guilds, a form of organisation which discouraged competition within a trade and by setting up restrictions and controls, it lost touch with the market, and sheltered within it an inefficient means of production. The model considers only producer-retailers however, and although this was probably the dominant type of enterprise in the past, large merchants were able to expand,buying and selling, or controlling the production of the bazar through some economic hold via rents or sales. This, the merchant class was able to thrive despite political insecurity and banditry which hindered trading connections. In the eighteenth century merchant organisation was much less rigid than the artisan guilds though co-operation was evident in the existence of organised long-distance caravans, especially along the silk road.

3. IMPLICATIONS FOR THE GENERAL HYPOTHESIS

In terms of the general hypothesis of development in the city, the model outlined provides a description of a steady state which might have existed in the past. The changes taking place are now of more interest to this work, and will be analysed and explained using the model as a background and for comparison (Chapter 16). Before this is done however some general implications of the model as it stands are evident.

The city is as we have seen, split by economic and social criteria into two broad divisions, two populations, one occupying the old town (A), the other the new town (B), and the terms 'old' and 'new' have been used to refer to this division. A clearer way of looking at the situation is now at hand however.

In the old town (A) we have observed a large population of relatively poor people living at a high density. In terms of the variables used in the model -

X is high

M is low

U is correspondingly high for a given product

In contrast, the new town (B) has been shown to be characterised by a small population, of more wealthy people, living at lower density, so that

X is lower

M is higher

U is correspondingly lower for a given product.

If the city of Mashhad is divided in this manner, then (M.U) is also divided, since both M and U are constants at any given time for the total population. Demand however (M.U.X) might be expected to be roughly equivalent in the two sections of the city, and prices roughly the same (Fig.40,B). Evidence to support this is reviewed later. However analysis of the data on expenditure (Chapter 12) indicated that such equivalence can exist only for low value goods, as far as area Z in Fig.40,B, beyond which the income of population A is not large enough to allow consumption of the higher value goods - utilities for A tends towards zero. Beyond point Z population B continues to demand goods for which its utilities are stretched, due to a higher average income. Thus demand for a given product differs between the two populations, in addition to which population B can consume higher value products excluded from the consumption of population A. In A there is little or no demand for private cars since income does not attain the necessary size, whereas in B there is a limited demand for cars - A's luxuries are B's necessities. However within B, there will always be a demand for bread and although its utility is high, it is lower than for population A, and this represents a smaller percentage of larger income, so that the price of such a commodity remains roughly the same for the two communities - this applies to most products below point Z.

Z is not a clean break, but a gradation, and in reality this gradation, even in the past may have covered a significant proportion of the population. Today this is certainly the case, for as seen in the chapter on income and

expenditure (Chapter 12) large minorities of 'rich' are to be found in the old town (A) and equally large numbers of 'poor' in the new town (B) - this is especially evident in Fig.33. Moreover whilst it is true that society is becoming increasingly organised along class lines and that this organisation is given spatial expression, it is also true to say that the distribution of incomes is becoming less extreme with fewer very rich and fewer very poor. Whilst locationally more distinct, the classes developing can be expected to be less far apart in terms of income. As development continues, and average income grows, we can expect income to be more evenly distributed. The population represented by Z in Fig.40,B, may be expected to grow and utilities will generally decline for present items of consumption, as new items (luxuries) are added.

This growth and redistribution of real income carries with it many implications for the economic organisation of the city, and explains why the old type of bazar-organisation hypothesised is no longer dominant in Mashhad. In particular, as demands become more sophisticated larger quanitites of newer products are sought. In the past this process was confined to the goods available - bigger, better and more expensive carpets, or ornate gardens maintained at great expense were the ostentations of the rich. Today the goods necessary to fulfil demands must be imported or made in large factories by mechanised processes - goods such as refrigerators, cars, and electrical equipment, which are being handled by larger merchants who pass them onto retailers. The result of this is that the basic producer-retailer enterprise is becoming obsolete, for with severe limits of 'n.min' and 'n.max', adaptation

is difficult, though not impossible on a limited scale. In order to fulfil modern demands some coalition of capital, labour and effort is necessary, and the result is the appearance of larger units employing more workers at paid rates and the growth of specialised functions such as retailers, or producers or wholesalers, cutting across the old types of vertical organisation.

The limits to which the producer-retailer unit can be adapted are already being exceeded, as perhaps they have been in Beirut and in Tehran, and the economic power of the bazar is in decline. Such changes and developments and the implications they have for the land use structure of the city are however the concern of the next chapter.

Notes to text and refernces

1. A few papers have been published on this type of topic, which have appeared only recently.

Chief are-

Dean, E.R. 'Social determinants of price in several African markets' Ec. Dev. and Cult. Change. XI 2. Jan.1963.

Kuhn, A. 'Bargaining power in transactions - Basic model of interpersonal relationships' Am.Jnl. of Ec. and Sociol. Vol.23 Jan.1964. No.1.

2. Even if expansion were possible, and more products made, cost of production per unit could not be lowered, since only hand methods were used, and economies due to large scale operation, or mechanisation were not available.

3. This explains the observation made by many writers that most of the capital in enterprises of the Urban Middle East seems to be locked up in unsold stocks of goods.

4. Gibb H.A.R. and Bowen H. 'Islamic society and the west' Royal Inst. of Int. Affairs, 1950. Chap.IV.

5. idem

6. idem.

16. ECONOMIC ORGANISATION and its response to URBAN GROWTH and TECHNOLOGICAL CHANGE

1. Introduction
2. Some qualifying factors
3. The data
4. The Textile Industry
   a. early development
   b. present day structure of the woollen industry
5. The Carpet Industry
6. The Footwear Industry
7. The Copper, Brass, and Samovar Industry
8. The Jewellery Industry
9. Wholesaling
   a. wholesalers of agricultural produce
   b. wholesalers of products manufactured outside Iran.
10. The Pilgrim Trade
11. Retailing and other Functions
12. Summary and Conclusion

1. INTRODUCTION

As urbanisation continues, cities begin to grow in size, and this has three main implications for the economic organisation, industrial and commercial, and indirectly for the land use structure of the city.

Firstly the extent of the division of labour, or functional specialisation in society is largely determined by the size of the market, as Adam Smith showed as early as 1776:-

> 'As it is the power of exchanging that gives occasion to the division of labour, so the extent of this division must always be limited by the extent of that power, or, in other words, by the extent of the market.'[1]

Thus in a village of a hundred persons, a man who specialised only in producing copper utensils would soon starve to death since so few persons would not demand sufficient of his utensils to afford him a living. However in a city of 100,000 persons, for example, such specialisation becomes possible and is a necessary feature of the increase on productivity which allows 100,000 persons, none of whom produce food or clothing directly for themselves, to live in one centre. Functional specialisation within a product group also becomes feasible. The producing function for instance may become separate from the retailing function as one man specialises in making the copper utensils, another in selling them.

Secondly as cities grow in size, demands for land exceed supply and land increases in value and price. As shown, urban land values in Iran tend to be related directly to the degree of relative accessibility at any point in the city. Sites in central areas become so costly that only those functions which

can benefit from a central location and withstand the high costs are able to survive. These are the higher order functions of retailing and servicing. The lower orders, such as wholesaling and production, needing larger amounts of cheaper land are transferred to peripheral areas in order to keep down costs, and (as motor transport grows in importance in Iran) to gain a non-congested site. Individual entrepreneurs are faced with decisions forced onto them by rising costs (particularly of rent) which after a period cannot be passed on to the consumer in the form of higher prices, without an increase in productivity. Productivity can be increased in several main ways, - by mechanisation, by expansion, or by specialisation, or by a combination of all three. An entrepreneur in the bazar, for example, might retain his shop purely as a sales area, moving the production function to a lower rental area. Functions thus not only become specialised, but find a physical expression in the land use structure of the city. In general the split between retailing and production is organised in one of two ways:-

(a) the functions continue to be controlled by a single entrepreneur, though carried out in different locations, or

(b) the functions are controlled by different entrepreneurs, with a cash transaction or a contract of some sort to link the two.

Divisions between other functions are less easy to generalise and will be discussed later. It is clear however that this process of functional splitting and its spatial expression, marks the beginning of special and fairly exclusive areas of land use with which we are familiar in western cities. In Mashhad the process appears still to be under way, and may never be complete. It would be a mistake to assume that because Mashhad is undergoing influences

similar to those which shaped western cities, that it will develop along similar lines to the latter.

Thirdly, as a by-product of economic development and technical advancement, commercial enterprises are either becoming mechanised (and therefore, usually, larger) or they are feeling the influence of mechanisation as it takes place in other sectors of the economy. The mechanisation of certain industries, and the growth in size of the producing units concerned can only take place as capital becomes more freely available, and interest rates begin to fall. As shown in a previous section,[2] the scarcity of beneficial investment, and the height of interest rates have been until recently the main factors tending to preserve the 'smallness' of enterprises in the economy. However although government investment and nationalised industries are not developing at the desirable rate (-unlike for instance in Turkey under Ataturk), the advent of the oil industry and the development of land reform havereleased much capital into the economy. In Mashhad large workshops and, in the last twenty years, factories have begun to appear as a result of this. The new sugar-beet factory for instance to the east of the city is financed by a group of former landowners that, finding land under reform is not the most secure investment, is now turning to industry. However other trends are also visible as a result of mechanisation. Hoselitz points out that in Asia generally:-

> 'The further development of large scale industries in cities will of course not by itself eliminate the many small self-employed artisans that are now being found here. As has been observed in the more highly developed countries, the growth of large scale

industries does not replace small enterprises completely, but changes their form and nature. Instead of large and small-scale firms in the same industry existing side by side, the smaller firms tend to perform economic functions subsidiary to the output of the larger firms; for example, the development of a mass production automobile industry, which is characteristically organised in plants of giant size, calls for the development of garages, gas-oline stations, repair shops, on the one hand, but also suppliers of various parts such as stoplights, windshield wipers etc., on the other[3]

Although of course no automobiles are actually produced in Mashhad, their maintainance, upkeep and supply is a large industry, and almost all the caravanserai of Kh. Tehran are devoted to it. As Table 42 indicates, there are 465 enterprises involved whose average number of employees is only 2.7. There are other examples of this in the city, to be dealt with in more length later.

2. SOME QUALIFYING FACTORS

Whilst each of the three main trends discussed above is fully operative in Mashhad, the degree to which an industry is specialised functionally and the extent to which different functions within it are forced to locate separately, are both controlled by the nature of the industry itself. There are several factors involved:-

(i) the extent to which the processes of production are divisible into separate and semi-independent operations. Some industries involve a more complex series of skills than do others, such as jewellery, whilst others are more repetitive by nature, the value of their products

lying in their standardisation by size or quality. It is these latter industries which lend themselves to functional differentiation, which may or may not be accompanied by a separation of location, dependent on factors below.

(ii) the extent to which the industry becomes mechanised as development continues. This is partially due to factor i above, and partially due to the differential rates of assimilation of (western) innovation by industries.

(iii) the apparent mean, or optimum size of production unit under hand methods, or mechanised, measured here by the number of workers per unit. There is a tendency for larger units to be forced to move out to peripheral areas before smaller ones.

(iv) the value of the product dealt in, in relation to its bulk. A high value product will be able to withstand increases in land prices better than a low value one, and will occupy less space, if less bulky.

Since each of these factors controls the situation to a greater or lesser extent in differential industries, it is proposed to review some examples of the present industrial and commercial structure of the city. Despite the changes and the factors indicated above, certain areas of the economy of the city still lack basic distinctions between for example producing and retailing, or producing and wholesaling both in organisation and in their location in the city. The classic producer-retailer hypothesised in the model (Chapter 15) is still a common phenomenon in some product-groups, and other evidence of multifunctional organisation in the city is yet plentiful, recalling the vertical structure of the economy in the past.

Table 42

FUNCTIONAL STRUCTURE OF SELECTED INDUSTRIES, MASHHAD, 1963

INDUSTRY	1	2	3	4	5	6	7
TEXTILES							
Number of establishments	213	-	67	328	608	150	73
% of establishments	35.0	-	11.0	54.0	100.0	45.7	26.0
Number of workers	1917	-	147	492	2556		
Average number of workers	9.9	-	2.2	1.5	4.2		
CLOTHES							
Number of establishments	4	108	1	377	490	240	37
% of establishments	0.8	22.0	0.3	76.9	100.0	63.7	32.7
Number of workers	10	259	2	603	874		
Average number of workers	2.6	2.4	2.0	1.6	1.8		
CARPETS							
Number of establishments	124	-	13	179	316	106	18
% of establishments	39.2	-	4.2	56.6	100.0	59.2	13.1
Number of workers	1538	-	23	279	1840		
Average number of workers	12.4	-	1.7	1.6	5.8		
LEATHER (except footwear)							
Number of establishments	37	48	6	73	164	48	27
% of establishments	22.6	29.2	3.7	44.5	100.0	65.8	29.7
Number of workers	107	67	9	110	293		
Average number of workers	2.9	1.4	1.5	1.5	1.8		
WOOD PRODUCTS (not furniture)							
Number of establishments	490	52	4	197	743	144	272
% of establishments	65.9	7.1	0.5	26.5	100.0	73.1	50.7
Number of workers	882	120	7	315	1324		
Average number of workers	1.8	2.3	1.7	1.6	1.8		
FURNITURE (metal and wooden)							
Number of establishments	59		-	27	86	18	14
% of establishments	68.6		-	31.4	100.0	30.5	51.9
Number of workers	171		-	43	214		
Average number of workers	2.9		-	1.6	2.5		
CONSTRUCTION MATERIALS							
Number of establishments	68	59	12	166	305	73	22
% of establishments	22.3	19.4	3.9	54.4	100.0	44.0	15.8
Number of workers	307	402	22	326	1057		
Average number of workers	4.5	6.8	1.8	1.9	3.5		

INDUSTRY	1	2	3	4	5	6	7
BRASS, COPPER, SAMOVARS							
Number of establishments	39	274	-	19	322	9	102
% of establishments	11.7	82.5	-	5.7	100.0	47.3	32.6
Number of workers	77	561	-	34	672		
Average number of workers	2.0	2.0	-	1.8	2.0		
TIN GALVANISED STEEL SHEET							
Number of establishments	5	156	-	44	205	15	78
% of establishments	2.5	76.4	-	21.1	100.0	34.0	48.4
Number of workers	12	275	-	34	321		
Average number of workers	2.4	1.8	-	1.8	1.6		
BLACKSMITHS ETC.							
Number of establishments	15	218	11	117	361	73	60
% of establishments	4.2	60.3	3.1	32.4	100.0	62.4	25.8
Number of workers	31	569	30	170	800		
Average number of workers	2.1	2.6	2.7	1.5	2.2		
JEWELLERY							
Number of establishments	68	176	-	30	274	9	107
% of establishments	24.8	64.3	-	10.9	100.0	30.0	43.9
Number of workers	192	304	-	5.9	555		
Average number of workers	2.8	1.7	-	2.0	2.0		

VEHICLE SERVICE AND SPARES	Service and Repair	Wholesale (spares)	Retail spares			
Number of establishments	292	4	169	465	25	59
% of establishments	62.8	0.9	36.3	100.0	14.8	19.9
Number of workers	879	11	345	1235		
Average number of workers	3.0	2.8	2.0	2.7		

FOOTWEAR	Producer	Producer-Retailer	Producer-Repairer	Repairer	Retailer	5	6	7
Number of Establishments	61	349	47	307	146	910	274	90
% of establishments	6.7	38.4	5.2	33.7	16.0	100.0	60.5	19.7
Number of workers	134	1151	108	430	365	1288		
Average number of workers	2.2	3.3	2.3	1.4	2.5	2.4		

TOTAL*	1	2	3	4	5	6	7
Number of establishments	1416	1538	118	2179	5251	1184	810
% of establishments	27.0	29.3	2.2	415	100.0	54.3	26.4
Number of workers	6086	3987	251	3605	13,929		
Average number of workers	4.29	2.59	2.1	1.65	2.65		

1. Producer 2. Producer-retailer 3. Wholesaler 4. Retailer 5. Total

6. One man businesses in retailing 7. One man businesses in all other functions

* For purposes of the TOTAL, shoe repairers are classed with retailers. Calculated from Min. of Labour and Social Affairs, op.cit. 1963

3. THE DATA

Much of what follows is composed of impressions gathered during extensive interviewing of shopkeepers, and workshop and factory owners during 1963 and 1964. Statistical evidence was collected however from two sources.

(i) Preliminary results of the Urban Establishment Survey run by the Ministry of Labour in 1963 were made available, and summarised in Table 42. The survey is comprehensive and its classifications are based on the United Nations Standard Classification of Economic Activities which was modified for use in Urban Iran. Details of this Survey are in Appendix C,4.

(ii) A survey of 10,000 establishments was carried out by the author in 1963-64 which mainly determines the location both by product and functions of about 80% of the commercial establishments in the city. Details in Appendix C, 5.

From Table 42 it can be seeen that enterprises in the city are still on a very small scale, and the largest average number of workers in any one part of the table is 9.9, for textile production. Moreover 37.9% of the establishments in the table are one-man businesses (the figure is 54.3% for the retail function). On the other hand there appears not to be a statistical relationship between the average size of producing units within an industry, and the degree to which that industry is functionally specialised (measured roughly by the percentage of producer-retailers in the industry). A rough check (Spearmen's Rank Correlation) shows a coefficient of only +0.36, yet this is one of the relationships hypothesised as one of the qualifying factors (above). The lack of such a correlation is probably due to the fact that only a selection of industries were included in the table (deficiency in classification excluded

many) and to the fact that we are only considering one of the possible relationships hypothesised. The other factors - the value of the product dealt in, in relation to its bulk, the degree to which the processes of production are divisible, and the degree of mechanisation, have not been measured and cannot be treated statistically. It is for this reason that we must resort to the discussion of some sample industries in more detail. The relationships held to exist between the factors can then be supported empirically.

4. THE TEXTILE INDUSTRY - PARTICULARLY WOOLLENTEXTILES

The textile industry possesses a high degree of specialisation in its organisation, and there were for example no producer-retailers recorded in the 1963 Establishment Survey (Table 42). Moreover the units within the industry, other than the retailers, are of relatively large size, and only 26% of the non-retailers are one-man businesses. The processes of production in the industry are easily divisible, and they are in part mechanised. These are the chief features characterising the industry today.

A. Early Development.

Originally most textile production in Mashhad must have been by hand methods - spinning, weaving, dying, and finishing, yet the distinctions between these processes were, it would seem, well maintained. Much of the production was probably in households, and today over 60% of those households which still have an industry are involved in some aspect of textile production (Table 40, Chapter 15). Later on as markets for textiles began to grow, and as trade developed, (the silk road helped) further specialisation, as well as the amalgamation of small units was able to take place. The 'spinning centre'

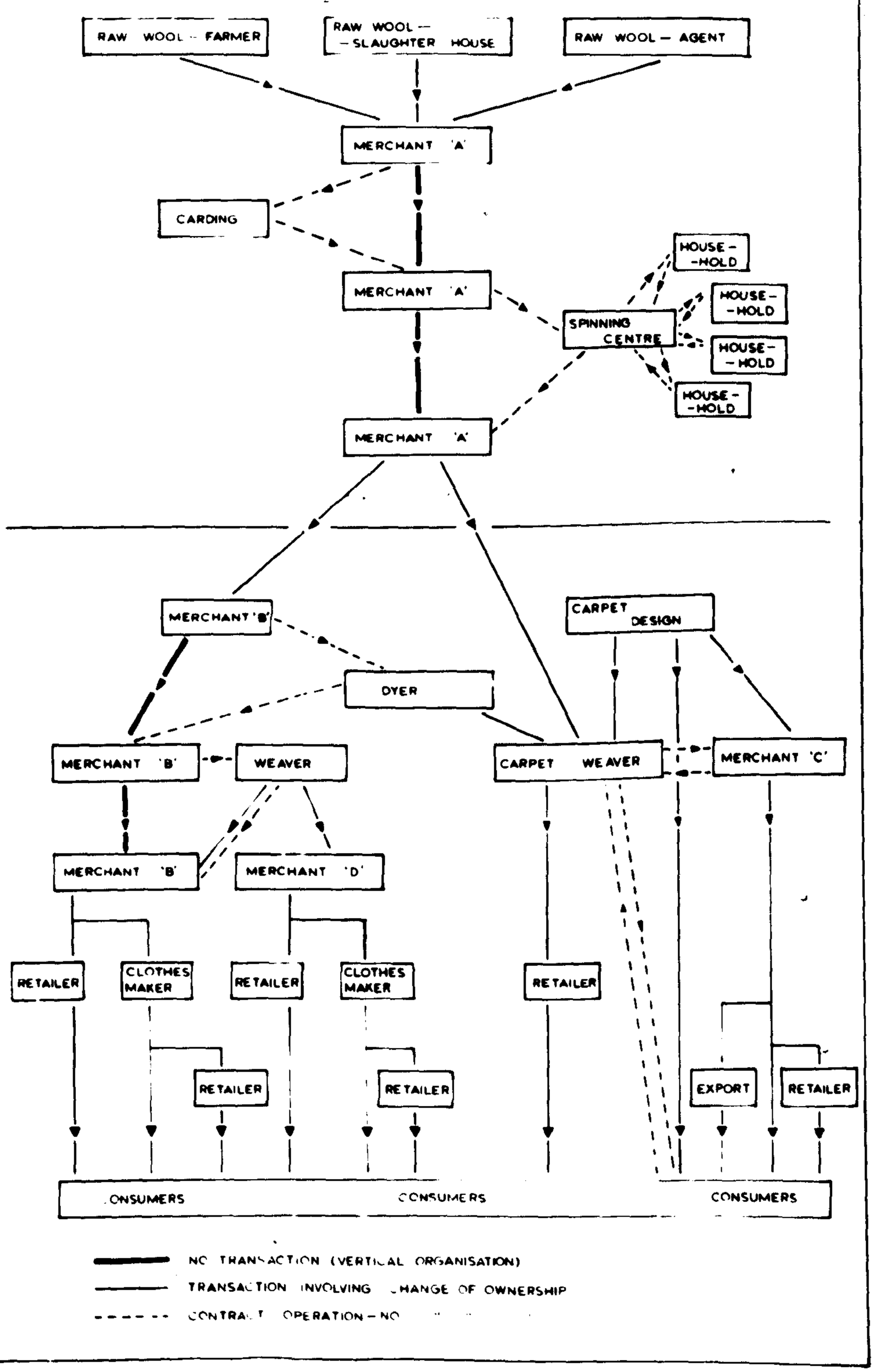
developed as a method of amalgamating the products of many households. This is a premises, rented by an entrepreneur who performs a spinning service for merchants. He takes the carded wool, or ginned cotton, and gives it to women who take it home, spin it, and return it to him. Today one such operator in Kutche Sia-Ab (north-east of the Harram, shown in Figure 35) undertakes the spinning of wool at 30 rials per kilo, and pays his women employees 10-15 rials per kilo. The spinning process is thus still a hand method, and still take the place in households, but is organised centrally. Many of these spinning centres are still active, though those spinning cotton are being driven out of existence by the establishment of the cotton spinning factory in the south of the city which has a capacity of about 3550 tons of yarn (cotton and artificial) per annum, and is much cheaper than these centres, despite the low labour costs of the latter.[4]

The carding wool process, and the ginning process for cotton are now mechanised to some degree. Small 'factories' using machinery, much of it imported [redacted] second hand from Britain and Germany are replacing the caravanserai where women were paid small amounts of money to do the process by hand.

Weaving factories have not yet been established in Mashhad, and almost all the city's weaving is still done on hand-looms in households or small workshops. Much of the yarn produced in the spinning factory is still woven by this method. However the influence of the large weaving factories in Isfahan is being felt in Mashhad. Large quantitites of high quality factory-made cloth from Isfahan are in sale in Mashhad, able to compete in price despite the disadvantage of long-distance transport costs. There is

Fig. 41.

ORGANISATION OF THE WOOLEN TEXTILE INDUSTRY, MASHHAD



as a result a decline in the hand-loom weaving industry, and an increase in the numbers of cloth-sellers in the city.

B. Present Day Structure of the Woollen Industry

Today the structure of the textile industry is highly complex since it is in a transition stage incorporating within it elements of a new horizontally aligned structure as well as fossil remnants of the earlier vertical type of structure. The woollen industry is selected for description since it is less complex than the cotton industry and illustrates well the factors outlined at the head of this chapter. A 'flow' diagram (Fig.41) is appended as an aid in discussion.

Raw wool is usually assembled by merchants 'allofi' of Type A who buy it either directly from farmers who bring it to the market at the end of Pain Khiaban during the shearing period; or via agents who tour the villages of Khorasan; or from the slaughter house east of the city. This type of merchant then contracts out to have the wool carded, and a typical carding factory might have 6-8 of these merchant 'customers' for whom it cards wool at about 5 rials per kilo. The Merchant (A) is expected to arrange for the provision of female labour at the 'factory' although the factory-owner provides the male labour (foreman, engineers). The carded wool, still the property of the type A merchant, is then taken (by porter) to the various spinning centres with whom the merchant has a contract, and is spun in the households of the women who work for the spinning organisation. The cost to the merchant may vary between 20 and 30 rials per kilo. So far the processes are each individually separate (a horizontal structure)

but are combined together by a merchant in a vertical fashion - there is no cash transaction between the stages in the production process. However at this point (when the yarn is spun) there is normally a break in the organisation of the industry, and type A merchants usually sell their wool. Though some merchants continue to control some of the later production processes, there is usually a horizontal line, as in the diagram, which completes a series of processes. The buyers of the yarn are of four types:-

1. dyers
2. type B merhcnats
3. weavers of cloth
4. weavers of carpets

Sales to dyers probably account for most of the total. The dyers are usually very small scale operators (average number of workers 1.9) and have only one, or perhaps two vats, and specialise in a limited number of colours of dyes. They are however located together in bazars, (two in number) and are collectively able to provide a full range of colours. This makes them mutually dependent. Thus a dyer who has blue in his vat and receives an order from a merchant or weaver for red, may well pass it on to a neighbour who happens to have red in his vat. Interdependence is a strong reason for continued existence of the bazars not only of dyers, but of other groups of establishments also. The coloured yarn is then sold to weavers and carpet weavers, though more often it is the latter two who place orders with the dyers for particular quantities of specific colours. In the main the dyeing trade is a distinct and horizontally organised specialism with its own location in the city (Fig.35) there are however

remnants of a former vertical structure. Type 'B' merchants for instance buy yarn and contract out separately to dyers who colour it at a fee, and to weavers who produce the cloth on the merchants' behalf - much in the same way as type 'A' merchants have the wool carded and spun. Type 'B' merchants dispose of the finished cloth through retailers or clothes' makers or directly to the consumer who then takes it to the tailor or clothes' maker for suits or shirts to be made.

Cloth weavers and carpet weavers may also buy uncoloured yarn and have it dyed to order, but this accounts for only a small proportion of the total, and in special circumstances, such as when the use of expensive vegetable dyes is stipulated by their customers. Bothe types of weavers more often buy their yarn ready coloured directly from the dyers. The cloth weavers, if acting independently sell their products to retailers or to other merchants of type 'B' or type 'D' who then dispose of the cloth through retailers or clothes' manufacturers. However today, with the growth in competition of cheap factory made cloth from Isfahan and Tehran, many weavers have to seek the economic shelter of weaving another operator's yarn (chiefly that of type 'B' merchants) who are able to extend credit to the weaver when the business becomes slack, or new equipment is needed, and who bear the risks on the market. This system is not preferred by the weavers who are reduced to the level of workers, paid about 4-6 rials per metre of cloth they produce. On average they are able to make 10 metres in a 12 hour day and earn less than when working independently.

5. THE CARPET INDUSTRY

This is the other main consumer of woollen yarn. Carpets are produced by knotting strands of woollen thread around a strong warp, carried on a vertical frame. The carpets are made to a special design, and their size is limited by the size of the frame on which three or four workers are normally occupied (if children are employed as is common , the number may be even five since they take up less space on the frame.) The most skilled worker is the design supervisor, whose labour is expensive. He can normally supervise three frames at once, and as a result carpet workshops are usually in multiples of three frames, so that each supervisor can be fully occupied. For this reason the average size of a carpet weaving establishment is high (12.4 workers). Partially because the turnover in the carpet industry is low (one carpet may take from three months to three years to complete) and also because the optimum size of unit is so large, and takes up so much space, the retailing of carpets is organised and located separately from their production, except in the fairly common case, where the customer orders directly from the carpet weaving establishment.

Carpet producers are sometimes large enough to act as their own retailers, accepting orders from customers and other merchants (type 'C') for carpets, and selling carpets from a separate premises in the bazar. More commonly however the units are too small for this and many of them both in the city and in the villages of Khorasan are organised under large merchants of type 'C'. These merchants collect together orders from customers or retailers in the city, and for export markets. The small carpet producers then work

to these orders via the 'C' type merchant. The design may be bought from a carpet designer either by customer or merchant, and if orders are not forthcoming the producer makes carpets to the traditional 'Khorasani' design, hoping to sell them later. This latter is a risky alternative since large amounts of capital are locked up in the carpet whilst it is still on the frame, and credits can only be obtained when working to the orders of a merchant, who carries the market risks and guarantees a sale. It is for this reason that many small manufacturers are becoming organised under the larger merchants.

This description of the woollen-textile and carpet industries is of course simplified and generalised, for in reality there exist a bewildering assortment of entrepreneurs combining under one organisation almost all possible types of function. However these are in the minority, and the main types represented in the diagram undoubtedly handle the greater part of production in both industries. Whilst there are fine degrees of functional specialisation within the industries, the distinctions between these are sometimes blurred. Those merchants of type 'B' for instance may be sometimes producing, wholesaling, and retailing - organising a small part of the woollen textile industry vertically; but horizontal breaks in the processes are also fairly well developed, particularly as we have seen, at the termination of the spinning process, or in the clear-cut distinction between producers and sellers of cloth. (No producer-retailers of cloth either cotton or woollen were recorded in the Establishment Survey of 1963). The location of the various functions in the industries is affected by the structure reviewed above.

In the woollen textile industry, the fine degrees of functional specialisation attained are unaccompanied by mechanisation, and the units of production remain fairly small. Because of this there has developed a high degree of mutual interdependence between the various parts of the industry, and as a result the majority of units are still located together in one particular area of the city (see map Fig.35), served by porters operating on a freelance basis who form the main means of transport for the short distances involved. So strong is the need for proximity that it is only where there is a clear cut distinction between functions that the differential price of land exerts enough pressure to cause relocation in the industry. Retailing for instance, structurally a separate process in both woollen and cotton industries, is in both cases located in the central areas of the city where access to customers is great but where rents and sargofli are high. Most cloth sellers are in Bala Khiaban and the bazars of the central old town, whilst the many units involved in cloth production are located away from the main avenues in lower rent areas. Similarly there is a high concentration of carpet sellers in the two carpet bazars, which consist exclusively of carpet shops. The Bazar Bozorg has 56 shops, the Gelim Bazar 68 shops all of whom are selling or taking orders only whilst only 45 carpet shops (25.2% of the total) are located anywhere in the city outside the two bazars. The advantages of being located in the bazar-namely that a greater variety of carpets can (collectively) be offered, and that services can be shared, outweigh other considerations of location. This may be the reason why only six carpet shops are to be found in the new town centre of Pahlevi-Khosravi.

6 THE FOOTWEAR INDUSTRY

The structure of this industry is not so functionally specialised as the woollen industry. Table 42 shows that over 40% of the establishments in the footwear industry are multi-functional most of these being some combination of producing, retailing and repairing. Establishments in this industry are much smaller than in either the carpet or woollen industries, the mean number of workers being 2.4. per unit. The general small scale of operation is probably because the production of shoes is not so easily divisible into separate processes as is the textile industry, and one man can effectively work on one pair of shoes unlike for example the situation in the carpet industry where three or four workers are necessary to operate a carpet frame. The footwear industry is even less mechanised than the textile industries, since because it is not divisible into separate processes, it has not been able to assimilate technical innovations. Consequently most shoe production units are also retailers and are based on hand methods of production, a type of commercial enterprise which conforms closely to the hypothetical model earlier outlined.[5] Each shop is controlled by its owner who may have a family worker or a paid employee to help. Units which produce shoes only are few in number, making up only 6.7% of the total.

Mechanisation is affecting the industry from a distance however, for there exists in Tehran a large factory which processes, tans, dyes, and chromes leather for the footwear industry. This has had an effect somewhat different from that of the weaving factories of Isfahan on the textile industry of Mashhad. In this latter case the competing factories are

producing a finished product and as seen, the small units in the weaving industry are undergoing amalgamation and re-grouping as a result. In the case of the footwear industry, the mechanisation applies to the raw material, which has rendered tanners and dyers of shoe leather almost obsolete in Mashhad, though some still prepare other types of leather for use in the clothing industry (Table 42 item 4). More significantly however mechanisation is providing a cheap source of supply of finished leather to the producer-retailers, thus encouraging their continued existence. Moreover wholesalers of leather are growing in importance as more leather from Tehran is used in the city.

Additionally, the industry also performs the function of repairing footwear, and another 40% of the total units are involved in this, few of them actually producing new footwear of any kind. The repairing of footwear involves very little capital expenditure at the outset; and many economically marginal units are able to survive off the very small profit margins available. Many of these are located in these bazars which have declined in importance, where sargofli and land values are low, and premises cheap to rent; others tour the residential zone, mending shoes on the spot. Because of the marginal nature of such activity, there is a continous change in the numbers of establishments practicing it, some going out of business, others entering the market with small amounts of capital such as a few nails, a hammer, a knife, and some second hand leather.

It would appear that the economic boost given to the footwear industry by the leather finishing factory at Tehran is tending to preserve the

producer-retailer even in central areas where rents and sargofli are very high. Only 16% of the total establishments in footwear specialise in retailing alone. Even in the shoe bazar, only 30 of the 89 shops are pure retailers, and a further 30 are producer-retailers, leaving 19 wholesalers of leather, and 9 producers of shoes and leather goods who do not sell directly to customers. Only one repair shops exists in the bazar - high sargofli are prohibitive to such marginal economic activity. The shoe bazar and its immediate neighbours contain only 139 out of 910 foot-wear establishments in the city - only 15.3% (or 22.9% if repairers of shoes are excluded). These figures contrast sharply with the carpet bazars, where all establishments are retailing only, and 84.8% of all carpet sellers are located in the bazars. This contrast is partially due to the fact that customers are willing to travel less distance to purchase a pair of shoes than they are for an expensive carpet, and so there must be more shoe shops, more evenly scattered through the city. Thus the new town centre with only two carpet shops has 38 shoe shops.

Equally, it would seem that the small space occupied by a shoe maker and the lack of functional distinction between producing and retailing are partially responsible for the fact that production still takes place in the shoe bazar. The situation is changing however. One shop owner has recently moved his two employees out of the bazar shop to a cheaply rented premises in a caravanserai off Pain Khiaban. He remains in the bazar just to sell shoes (for which he has more space) and a porter carries shoes from the producing unit to the shop. For reasons of cost and amenity the functions of retailing and production are here split - perhaps a forerunner of the factory-shop relationship yet to come.

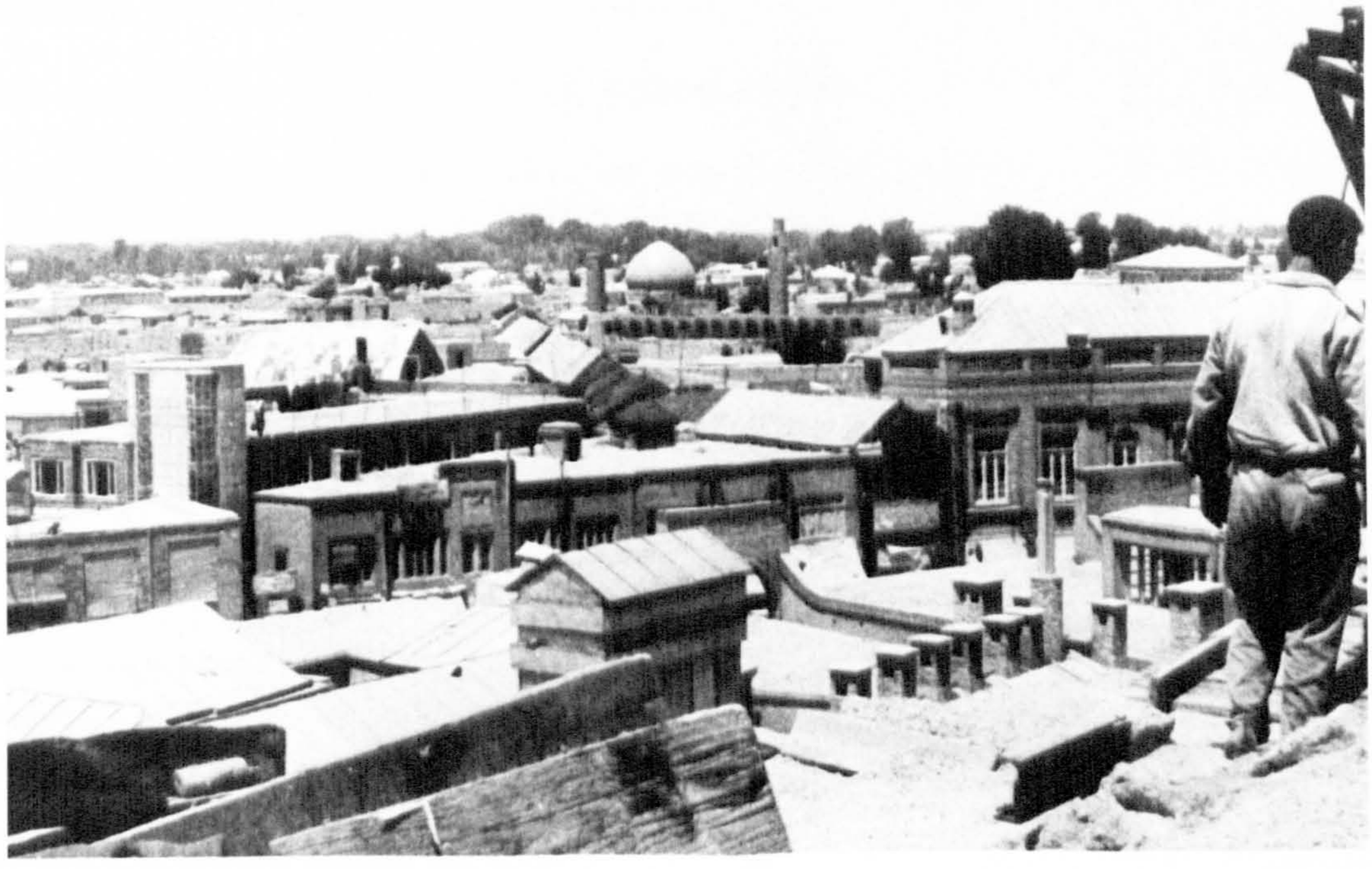
Shoes manufactured in Italy and in other European countries have begun to arrive in Iran, and Mashhad receives its share. These shoes are expensive and so although such imports encourage specialised retailing the shoes are only to be found in the 'smart' shops of the new town centre, along Kh. Pahlevi, where a market is available for high cost shoes which confer status on their wearer. The quality of the imported shoes is often inferior to Iranain copies of them, but western origin is a greater selling point, and the imported shoes are thus more expensive.

The shoe industry can be said to have an organisation radically different from those of the textile of the carpet industries, and as a result of this its distribution on the ground and its response to technological innovations are also in great contrast to the latter two. There is however one other aspect of the footwear industry that must be considered. This is the production of a light shoe worn universally in the summer time, known as the 'giveh' which has canvas uppers and a leather or a rubber sole. This is a cheap shoe worn for a season and then discarded, new ones being bought each summer, and so large quantities of giveh are in demand for a short period each year. Giveh production, in complete contrast to that of leather shoes is organised wholly independently from the sale of giveh. In no case were production and sales found to be on the same premises. Because the value of giveh lies in the large numbers which must be turned out quickly, production is organised in a sort of 'flow-line' system. In one establishment the canvas uppers were bought from a merchant who obtained them in Nishapoor where a special cotton makes their production possible. One worker cut the soles from an old tyre purchases at a local garage, a second stitched on the uppers, a third trimmed with leather

Plate 25.

A coppersmith/tinsmith shop in the old town.

Plate 26. The old town centre - Bazar Bozorg.



and a fourth whitened the finished product. These processes are carried out in one establishment, and it is largely because they are organised in this fashion that the sale of giveh is not on the same premises. The finished product is sold through established shoe shops in the bazar and elsewhere. The characteristics displayed by the giveh industry are thus a product of the features which distinguish it from the less specialised leather footwear industry.

7. COPPER, BRASS AND THE SAMOVAR INDUSTRY

Brass and copper were the traditional materials for the production of working equipment, containers, maps, etc. until after the second world war when galvanised steel sheets became freely available and when, in about 1950 plastics also became common and cheap. The copper and brass products industry is the least specialised of those in Table 42 with 82.5% of all establishments both producing and retailing the articles and only 5.8% in retailing alone. Wholesalers of copper are not included in this list. The size of establishments is small, averaging 2.0 workers per unit, which places the industry close to the bottom of the list in terms of average size. For normal domestic type of vessels and equipment produced, the difficulty of separating processes, other than that of nickel plating, means that copper working remains a skilled hand industry, each man producing a finished product from sheet metal. Units are small and the distinction between retailing and producing remains blurred. (Plate 25)

However, the copper-brass products industry has its special aspect as does the footwear industry - the production of samovars, which is an assembly operation. The samovar is a water-boiling vessel with a built-in

source of heat, formerly charcoal burning though more often paraffin-fired. It is a complex piece of domestic equipment to produce by hand and as many as seventeen different parts and processes of operation are necessary to produce the finished product, from beating the copper vessel, to making and assembling feet, handles and tap, and nickel plating. The finished product costs between £4 and £20. It was found that very few of the enterprises in the industry carried out more than one or two of the production processes, so that as many as 10 or 12 units are involved in the production and assembly of one finished samovar. Few of the 118 enterprises in the industry also sell samovars, and in this respect the industry is much different from the copper and brass-ware industry in which retailing and production are rarely separated. The links between the many units are complex, and as in the woollen textile industry there is a great deal of mutual dependence. Each unit may be organised in one of several main ways.

1. Some units perform a 'service' on a part of a samovar belonging to another unit, such as those establishments which invest in the machinery necessary to press the copper cylinder into its traditional shape.

2. Many workers own that part of the samovar they produce, selling it to the owners of other parts to which it will be affixed; the makers of the smaller fittings are often of this nature. Others produce some parts, and buy others, assembling these into a finished samovar ready for nickel plating.

3. The most common system appears to be where the maker of the cylinder is also the assembler of the finished product, the cylinder passing from shop to shop as pieces are added to by various workers, before it is returned.

The originator then has it plated, and sells it directly, or through a retailer.

Such a high degree of interdependence as this means that a single samovar enterprise cannot exist in isolation, and it would seem that the existence of a bazar for the industry would be in the interests of all concerned. In the past such a bazar did exist in which both coppersmiths and samovar makers were located - O'Donovan noticed in 1882 that there was a well developed bazar of coppersmiths in the city,[6] and the coppersmiths' bazar is a most common one in cities of Iran today such as Isfahan, Shiraz, and Tehran. Clarke describes that of Shiraz for instance -

> 'It is clear that at one time trades were more clearly segragated in the bazars devoted to shoe shops, or silversmiths/goldsmiths, or samovar makers or carpet sellers; the only example of a homogeneous bazar is the coppersmiths/metal workers, whose frenetic hammering could not be tolerated elsewhere'[7]

Yet in Shiraz too, there is no samovar-makers' bazar, despite a thriving coppersmiths bazar. The reasons for decline in the copper and brass industry generally are not difficult to find. In Mashhad one of Reza Shah's new Khiabans cut through the coppersmith's bazar, dispersing the enterprises within it, and since in any case new materials — galvanised steel and plastics, cheaper and often better than copper ones were arriving on the market, demand for copper goods declined and the copper bazar never became re-established. The continued existence of coppersmiths' bazars inother cities of Iran must be in some doubt, as decline is usual in the industry. It is possibly for this reason that in Shiraz the bazar is now of 'coppersmith/metalworkers'

as workers in galvanised steel sheet slowly replace the copper-smiths. The lack of samovar-makers' bazar in Mashhad and possibly in Shiraz can also be explained in terms of a fall in demand.

Fashions in house-furnishings are changing and the samovar is becoming less essential in many houses as pure piped water is made available (rendering it unnecessary to boil large quantities of water for drinking purposes). Even attempts at modernising the samovar, such as re-styling it, and fitting paraffin burners, seem not to have prevented a decline in demand. A group of retailers in Mashhad, in 1963 complained that they were selling only one or two samovars each week whereas the number formerly was eight or ten. The 118 establishments in samovars are still however interdependent, and two small groupings are in existence in Mashhad - though these account for only about 40% of the total; the rest are scattered through the city in groups of two to six. The result is that half finished samovars are a common sight being taken from shop to shop in the city - usually on the heads of porters mounted on bicycles. Also because of interdependence, decline seems to operate much as the model describes,[8] with a high number of producers in the market, selling on average fewer samovars each month, but clinging on until the absolute minimum number to ensure economic survival has been reached. As production continues but sales decline, an increasing amount of capital becomes locked up in the growing number of finished samovars, which must eventually be sold at a loss.

The copper and brass-ware industry and the samovar industry are examples of enterprises in decline as technological innovations render them obsolete. Their differing structures cause a slightly different response to decline, and

to present day location in the city. Whilst vestiges of a samovar 'bazar' still exist, that of the coppersmiths with their inseparable producer-retailer units, has vanished completely in Mashhad.

8. THE JEWELLERY INDUSTRY

This provides us with a final example of how industrial and commercial organisation of an industry affects the location of the enterprises concerned in it under conditions of technical change and urban growth. Jewellery as a product is characterised by low bulk, and also high value part of which stems from the individuality of each piece of it. Each piece is made separately by a worker, and because individuality and beauty are part of the value of the finished product, the process of production tends not to be divided into separate operations other than into the broad divisions of stone cutting, and stone setting. Indeed hand methods of production are still common even in the western world. As a result of this type of structure, over 60% of all establishments are producer-retailers, and only 30 jewellers (10.9%) are retailing alone. The producers in Table 42 are merely stone cutters, whose finished work is sold to the jewellers to be set and mounted. Thus even in high rent areas, where sargofli are high, jewellers almost always have a workshop behind or above the sales area, though many of the workshops are indeed tiny. The fact that jewellery is of high value and its production takes up so small a space, is no doubt largely responsible for this situation.

The emnity which seems to exist within trades between those practising in the bazar, 'Bazari', and those whose shops are in the new town centre is full-

maintained in the jewellery business. Most of the skilled workers are however still in the bazar, and produce some of the jewellery which is sold in the new town centre where, co-incidentally, the only pure retailers of jewellery in the city are to be found. Despite this situation the number of jewellers in the new centre grows each year and almost all of these new premises are set up by jewellers from the bazar - in complete contrast for instance to the carpet industry which has only two retailers in the new centre. The advantages of the new town centre are great, and one of the larger jewellers of Pahlevi who moved from the bazar in about 1951-52 indicated his reasons. Firstly competition and undercutting were beginning to develop in the bazar as some jewellers used low quality gold to attract a larger market; secondly much money could be made by selling a satgofli in the bazar (about 100,000 rials) and purchasing one in the Pahlevi area (about 50,000); thirdly the Pahlevi area was recognised as a place in which new ideas could be introduced and where top quality jewellery (on which most profit is to be made) could more easily be sold. His supply of stones, cut or uncut, was still from the bazar however.

The jewellery industry thus reacts in its own particular way to changes that are taking place in the economy and because it is a high value and low bulk industry, it is particularly able to take advantage of the high-priced central locations, vacated by lower value industries, and lower order functions. It is also able to maintain its production function within these high value central locations.

9. WHOLESALING

So far we have largely been concerned with the functions or production and retailing, and the merchants so far considered have in some way been connected with the production function. It is proposed now to discuss the wholesale of products which are not manufactured - such as cereals, fruit and vegetables, or other agricultural products, or those whose manufacture takes place outside Iran - radios or electrical equipment for instance. The chief characteristic of wholesaling is that it deals with goods in bulk quantities and has little contact with the eventual consumers of the products. In the past and to some extent today, sales functions on a large scale have been a greater source of wealth in Iran than have production functions. This is recognised when we read of the ascendency of trade and commerce in the history of Iran; and large scale investment in anything other than land was chiefly restricted to trade and commerce, not manufacturing. Trade in Iran involves the movement of goods over long distances and in order to allay the costs of transport, such goods must clearly be moved in bulk, a necessity which has become more marked as transport has become increasingly efficient and mechanised.

However the eventual consumers of goods are individuals or families, and so at some stage bulk must be split up into small quantities for distribution, which implies that whilst wholesalers must be restricted to a limited number of locations, the selling function (retailing) must be in a relatively large number of locations, each dealing with small quantities.

A. Wholesalers of agricultural produce

The villages of Khorasan were, and in part still are farmed on a share-cropping system with the landowner, or the tenant of the shrine sharing the crop with the villagers. The ratio of the division is normally determined by the number of the production factors supplied by each party, the factors being seed, water, land, labour, and animals, and a common ratio is 3:2 in favour of thelandlord or tenant who provides the seed, water and land.[9] During the marketing of the crops, this division between the shares of land/lord and peasant is often maintained and in some cases the two parties may make separate marketing arrangements. The wholesalers dealing with the crop are of two types.

A. Some merchants buy crops wholesale from the villages, often making a separate contract with the landlord and the villagers' headman. Credit is usually extended to the villagers at the beginning of each season, when the contract is drawn up at an agreed price, and at the end of the season this credit, used to buy seed, or water or food, is deducted from the money which the villagers receive. Many villagers are thus continually in debt and the merchant is able to secure the crops at very low prices indeed, year after year. The produce, both villagers' and landowner's is taken to the wholesaler by the villagers,using their carts or a hired truck. The wholesaler disposes of the produce to city retailers who collect it from his premises, some of whom hawk it around the streets of the town. Additionally some produce may be sold to merchants of other cities - much of Mashhad's fruit for instance is sold eventually in Tehran. This type

of wholesaler needs large premises for the temporary storage of the produce, as dealing is on the open market and there may be a delay between purchase and sale.

B. More commonly, wholesalers in Mashhad operate on a system under which they carry a minimum amount of risk. In this case the entrepreneur arranges the sale of a village's produce and charges a commission for his services, but does not guarantee the price at which the produce will be sold. The commission varies, but is usually 5% of the landowner's share and 10% of the villages' share, the differential representing the interest on credits loaned to the villagers at the beginning of the season. Contracts are usually made with the same villages each year, which guarantees a fixed supply (subject to weather fluctuations) to the wholesaler who acts as agent to the villages. The wholesalers dispose of their produce either to city retailers in which case the crop is delivered to the premises of the wholesaler by the villagers, or to merchants in other cities, who collect the produce directly from the village concerned, by truck transport. As agriculture in the Kash af Rud valley near Mashhad becomes more efficient and commercialised, sales are increasingly by this latter method. Indeed some merchants specialise in arranging for the produce to pass straight from buyer to seller and need no storage space in the city - they rent office space in the central areas (the serai around the Harram) and do much of their business by messenger and telephone.

More generally the advent of mechanised transport and the possibility of moving even food goods over long distances has meant that wholesalers have

moved out of central locations to peripheral areas where trucks have ease of access. They have moreover tended to maintain a system of locating by product group. Fresh fruit and vegetable dealers are at the end of Bala Khiaban, cereals at the eastern end of Pain Khiaban, and those dealing with textile raw materials are along the length of Pain Khiaban.

B. Wholesalers of products manufactured outside Iran

This class of wholesalers is concerned chiefly with imported manufactures such as radios, electrical goods, and all sorts of domestic consumer durables. Whilst most of these wholesalers are specialists, doing no retailing, their location is often in central areas for they are dealing with high value, low bulk products, and many of the caravanserai near the Harram are occupied by such merchants, who are, in this location easily accessible to retailers.

However some of these wholesalers also carry out some retailing. An example of this is the relatively few wholesaler-retailers who are agents under contract to western firms for the importing and distribution of a particular brand of relatively sophisticated manufactured goods, for which they demand an absolute monoply. Such are the radio and electrical dealers of Kh. Khosravi. The agent sells his goods to retailers at one price, 'trade terms' and to individual customers at a higher price, and his function is recognised, by law under the name omdefurush ('main seller') which protects him further by forbidding the khordefurush ('part seller') or retailer, to sell to another Khordefurush

('part seller') or retailer, to sell to another khordefurush at a profit goods which were previously purchased from the omdefurush. The khordefurush can sell only to consumers and thus is restricted by law to the single function of retailing, at least for that particular product. Thus the location of the omdefurush, in the new town centre, accessible to both consumers and retailers is of some significance. These wholesalers are able to maintain their location in the high rent, high sargofli area of Khosravi also because their products are of high value and low bulk.

In general then the location of wholesalers conforms to the influence of the pressure on land, and the need to take advantage of the technological improvements which are in part responsible for much of the present shape and structure of the city. Details and exceptions are determined by the type of organisation and product dealt in.

10. THE PILGRIM TRADE

At this point it is convenient to look briefly at the extent of the pilgrim traffic in Mashhad, and to note its contribution to the land use structure of the old town centre, and to the economy of the city.

Estimates of pilgrim numbers are difficult to make since there exists no really comprehensive registration system and only about one third of the lodging houses are licensed by the police department. The head of the shrine administration, after gate-checks at the Harram and a survey of the otobusleri (bus termini) over a number of years, gave the following figures:-

1325,	1946-47	35,000
1326,	1947-48	41,500
1327	1948-49	38,000
1328	1949-50	34,000
1329	1950-51	32,500
1330	1951-52	42,000
1331	1952-53	40,000
1332	1953-54	51,000
1333	1954-55	47,000

These figures are not large, but this was before the opening of the railway in 1335 (1956) which made the journey from Tehran much shorter (18-23 hours) and easier. Since then pilgrim numbers have greatly increased. Scharlau gives a figure of 200,000 in 1962, but omits to indicate his source[10]. A systematic collection of Police records, a survey of all the otobusleri, and information from the railway station indicated however that for the period 1342 (March 1962 - March 1963) the number of pilgrims could not have been less than 300,000 (100,000 by bus, 200,000 by train) and was probably more.

Pilgrim accommodation in official, licensed premises amounted to 264 mussafakhaneh (lodging houses) 8 mehmankhaneh (a superior lodging house) and 8 hotels which received in 1342 a total of 74,519 visitors, about 96% of whom were pilgrims. Almost all these licensed premises are located near the Harram, and appear on the map of the old town central area (Fig.35). However discussion with the head of the senf (guild) of mussafakhaneh owners indicated that since 1956, many non-licensed premises have been set up in private houses and disused car$_a$vanserai near the Harram, and along

Pain Khiaban, many of them ill-equipped to receive pilgrims, which absorb about 200,000 visitors each year. The police department claimed that between 1956 and 1964, 900 of these unofficial premises had been forced to close because of low standards of sanitation, - but this figure includes many which were opened repeatedly (even after closure) by different owners on the same premises.

The distribution of pilgrim visits throughout the year is not an even one, but is condensed into the main religious festival periods of Nau Ruz (New Year - 22nd of March); Moharram, the period of mourning for Husain and particularly the forty-eighth day of this when the death of the eighth Imam is remembered; and Ramadan - the latter varies in date throughout the year. Analysis of the records of two mussafakhaneh, and one hotel, and the Police records, showed that 59% of the total pilgrims arrive in these periods of the year (20 weeks - 38.4% of the year), and similarly, 25.6% of the total arrive in the seven weeks of Mohorram, 13.5% of the year. It is at these times that accommodation is difficult to find, and people sleep on the floors of the rooms, as many as ten or fifteen to each room, and sometimes in 'shifts'.

The effect of this on the land use structure of the old town centre is obvious, as large areas are given over to pilgrim accommodation, both on first floors on the fronts of avenues, and more generally in the buildings behind the main avenues and the bazars. Indirectly there are other effects in that the trade generated tends to support many more

mosques, public baths, and perhaps shops than would otherwise be the case - but their influence is largely restricted to the area of the old town centre, and those areas immediately adjacent to it.

A quantitative assessment of the effect of the trade on the economy of the city is not possible due to the unreliability of the statistics. However the records show that on average each pilgrim to the city stays 5.2 nights, at 35-40 rials per night, which would imply that at a conservative estimate pilgrim expenditure on accommodation alone during the year must be £25,000 - £300,000, whilst it is probable that an equal amount is spent in the shops and eating places of the old town centre, and on transport.

11. RETAILING AND OTHER FUNCTIONS

Retailers in Mashhad may be classified into several types. Firstly are the producer-retailers already discussed, secondly are retailers who are wholly separate from the producing function, such as carpet sellers, and thirdly (to be considered) those retailers of non-manufactured goods, or goods imported in a fully finished state. The first two of these types have been dealt with in some detail in this chapter, at least for some industries. The third type forms the majority of Mashhad's retailers consisting of thousands of small shops and mobile traders whose supplies are provided by the wholesalers discussed above.

This group of retailers (type 3) is, in its location, not restricted to a product group or a bazar, as the producer-retailers (type 1) and even the specialist retailers (type 2) tend to be. Because type 3 are largely

dealing in a great range of foods and other goods, they are not mutually dependent, and there is no special economic reason for them to be located adjacent to each other - unlike for instance the samovar producers, or the dyers, who provide a greater range of colour by being located close to each other in their bazar. Indeed since the basic function of type 3 retailers is distribution, their best location would seem to be at various scattered points in the city, so as best to serve the residential population, although small groups of greengrocers for example do occur in central areas.

The main factor governing the location of type 3 retailers would seem to be the relative degree of accessibility to customers possessed by alternative sites, qualified by the distance that the 'average' customer is willing to travel to purchase the particular goods being sold - what has become known as the 'range' of a good. This factor is not of course restricted to Mashhad, and has been put forward by many workers as an explanation of retail distribution in western cities. The same factor would also seem to be dominant in the location of any other functions in Mashhad which depend on access to customers for their trade, such as banks, insurance agents, tea-houses, hotels, and baths.

It was not possible to calculate the range of particular goods or services in Mashhad. However we can arrive at a crude approximation of relative range by counting the number of establishments selling each type of good or performing each service, and referring these numbers to a

Table 43

Retailing and servicing functions, Mashhad, 1963

	A.	B.		A.	B.
1. Grocer, food sales	1933	155	20. Confiserie, cafe	171	1754
2. Footwear *	849	353	21. Carpets, gelim	170	1765
3. Tailor	675	444	22. Doctor	167	1796
4. Clothes, accessories	485	619	23. Public Bath	156	1923
5. Vehicle service and spares	465	645	24. Leather goods, furs	121	2479
6. Baker	346	867	25. Fodder, corn, hay	111	2703
7. Blacksmith	335	896	26. Crockery, hardware	105	2857
8. Tea-house	330	909	27. Estate agent	103	2913
9. Cloth sales	328	915	28. Radios, electrical goods	80	3750
10. Wood products	310	968	29. Dentist	79	3797
11. Hairdressing	310	968	30. Chemist, perfumes	77	3896
12 Greengrocer, fruiterer	291	1024	31. Stationary	76	3947
13. Brass and Copperware	293	1031	32. Transport agencies	70	4285
14. Butcher	266	1128	33. Mosque	65	4615
15. Bicycles and service	228	1316	34. Laundry	61	4918
16. Construction materials	225	1333	35. Second hand clothes	56	5357
17. Jeweller	206	1456	36. Banks, insurance offices	38	7895
18. Eating establishments	205	1463			
19. Tin and galvanised steel goods	200	1500			

A. Number of establishments in the city

B. Support population for one establishment (standard population 300,000)

* All except producers (See text)

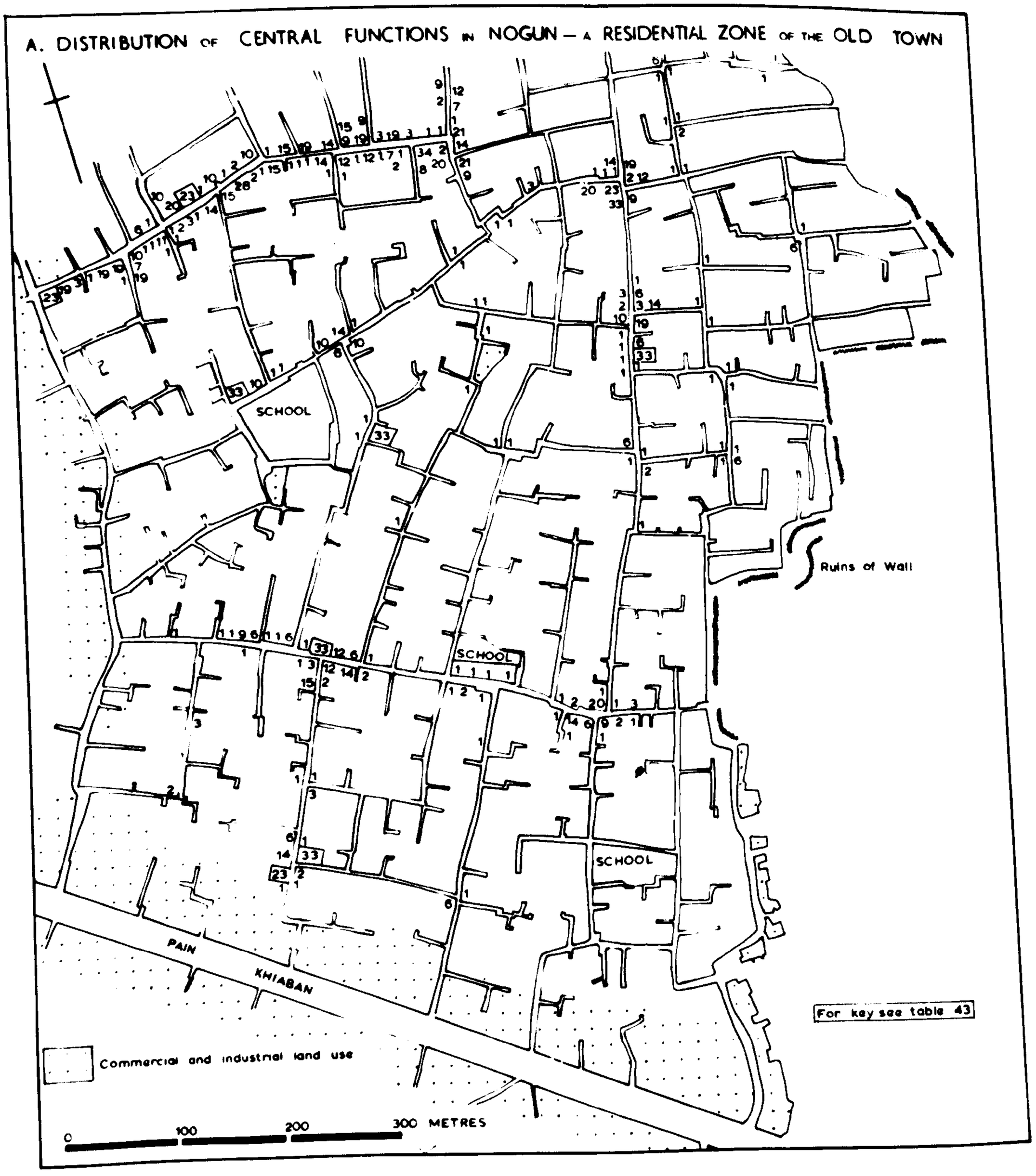
Note, functions with less than 40 establishments in the city are excluded, as are most non-commercial functions

Calculated from - Ministry of Labour, and Social Affairs, Iran, op.cit. 1963.

'standard'population (in our case 300,000 persons). This has been done in Table 43 which indicates the relative representation of the various types of establishment.[11] Thus there are many more grocers and general food stores (1,933) than hairdressers (310) and many more of the latter than baths (156) - producing a heirachy of retailing and servicing functions. Assuming for a moment that the population of the city is fairly homogeneous, and that shops are scattered at random through this population, then clearly since there are more grocers than hairdressers, this implies that people are willing to trave further to obtain a haircut than to buy groceries - the range of groceries is smaller than that of the service of haircutting. This approximation is crude, and assumes that shops within a product group, or establishments offering the same service are of equal size, but this assumption is not totally unwarranted in Mashhad since establishments do tend to be uniformly small in size. It ignores however the fact that there are 'mobile shops' in the form of individuals who tour the residential areas hawking their goods. Such details and exceptions are taken up later.

This hierarchy of shops and services (table 43) is well expressed in the land use of the city and in a system of central places graded in size and order from the corner shop of the residential area, to the two city centres. The smallest central place is a single shop at the junction of two kutches, and this is almost always a grocer or mixed goods' dealer of the corner shop type, selling a great range of convenience goods. At

Fig. 42 A.

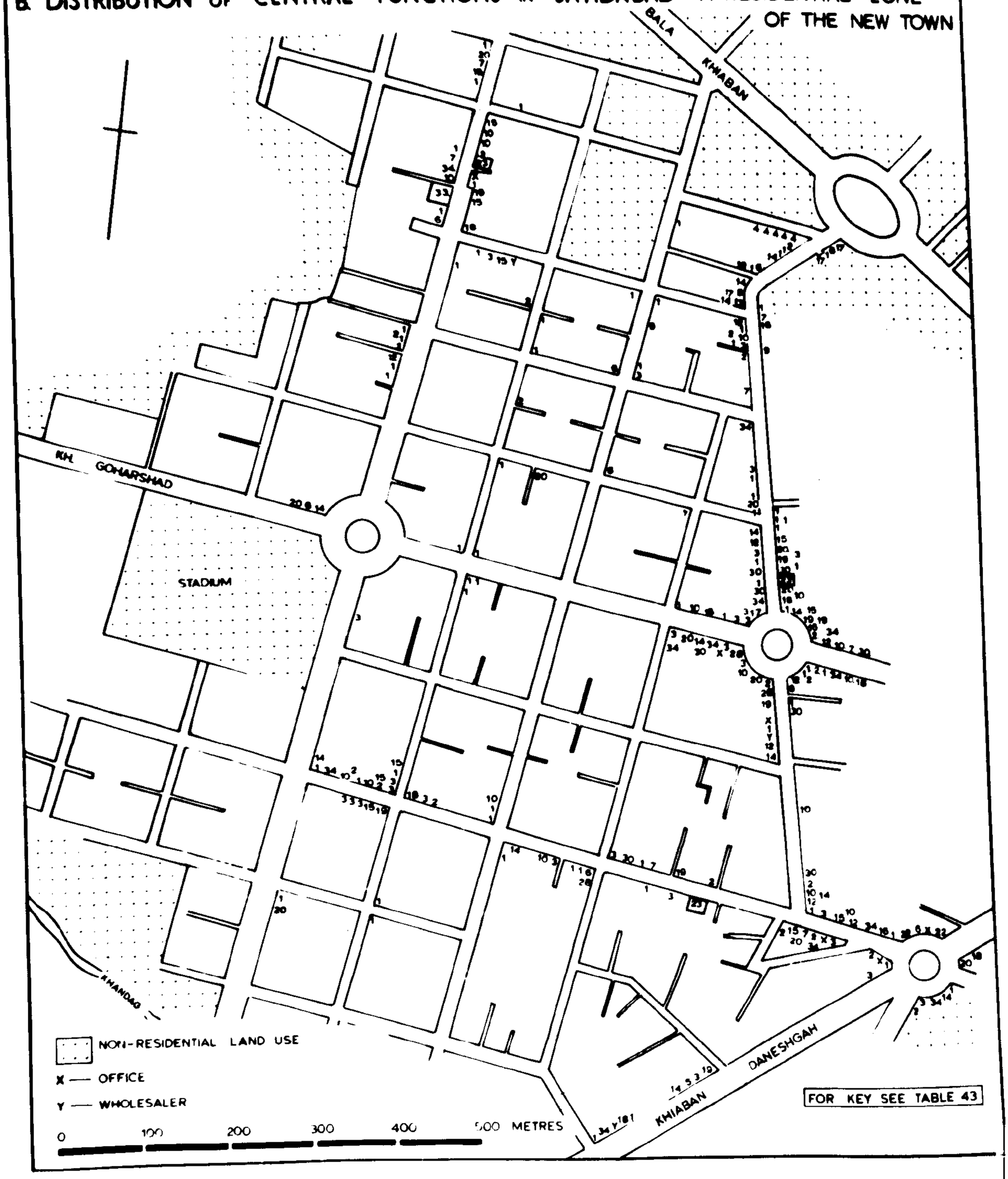

A. DISTRIBUTION OF CENTRAL FUNCTIONS IN NOGUN — A RESIDENTIAL ZONE OF THE OLD TOWN
SCHOOL
SCHOOL
SCHOOL
Ruins of Wall
PAIN KHIABAN
Commercial and industrial land use
0 100 200 300 METRES
For key see table 43

the junction of two kutches which each have a grocer or general dealer might be found a group of shops consisting of perhaps two grocers or general dealers, and some higher order function such as a producer-repairer-retailer of footwear, or a baker. This system builds up at the junction of streets in a manner analogous to the 'orders' of streams observed in geomorphological studies. The number and the height in the hierarchy of the shops found at a junction is presumably a function of the size of the population dwelling in the kutches tributary to that junction or in other words the relative degree of accessibility to cumstomers available at that point. The kutche system which is the product of truly spontaneous development appears to be an ideal environment for a central place hierarchy to develop.

The two maps (Figs.42 A and B) are examples of residential zones of the old town (A) and the new town (B). The two zones are of different size (A72.5 acres; B 208.0 acres) but whereas in zone B there are only 10,600 residents, the population of zone A is about 15,400. The details and exceptions to the central place structure previously mentioned which are dependent on numbers of people resident and on their chief economic and social characteristics, are dealt with below. In both maps the existence of a hierarchy is evident from the distribution of the code numbers. It will be noticed for instance that at points where only a very few shops are gathered, the shops are of low order function, and the goods they deal in are of limited range. In most cases the code number is below 10. In contrast, where larger groups of shops are gathered together

Fig. 42 B.

B. DISTRIBUTION OF CENTRAL FUNCTIONS IN SA'ADABAD — A RESIDENTIAL ZONE OF THE NEW TOWN



FOR KEY SEE TABLE 43

higher order functions are more common, with code numbers in the twenties or thirties. These shops, located at points of greater accessibility deal in goods whose 'range' is great, and the customers supporting these shops come from a wider area

The new town zone is of fairly high social class and families have higher income than those of the old town (Chapter 12) which contributes to the fact that shops within the new zone are larger and sell better quality goods than their old town equivalents. The greater social and physical mobility of the new town population means that is is socially acceptable for housewives to shop unaccompanied in the central areas (Pahlevi), whilst the taxi fare which makes this physically possible forms but a small part of the higher incomes of the new town zone families. In contrast, the lack of social freedom and the lower incomes which characterise the old town zone (A) confine the families within it to their home environment. In these circumstances the grocer's shops and the tea house take on an important social function in the life of the old town, forming a meeting point for the women and men (respectively) of the kutches tributary to them. Since housewives of the old town zone are more restricted to their homes, ped-lars of goods are often to be seen in the zone, and their 'mobile shops' are well patronised, even though credit is not available as it is at the corner shop which appears to have no difficulty competing with the ped-lars. Housewives of the new town zone much prefer to shop 'down town' where a greater range of better quality goods is normally available and where prices are usually lower. The price of cucumbers for instance in the summer of 1964 was observed to vary as follows:-

3 rials/kilo in shops of Pahlevi and the Bazar area

5-7 rials/kilo in shops of the residential zones

8-10 rials/kilo in shops from the ped-lars touring the zones

The housewife thus pays heavily for the convenience of shopping from the 'mobile' shop' which visits her household, and the goods are usually of poor quality. However, in the absence of a full survey of shopping habits, it is difficult to say more than this. Other differences between these two samples zones are evident. Only 12 out of the 65 mosques in the city are located outside the former city walls and zone B has only one of these, whilst zone A has a total of 5 mosques. This is partially due to the different size of population in the two zones; partially because Zone A is near the Harram and probably has many pilgrims who create a larger demand for mosques; and partially because zone B has 'too few' mosuqes for its population.

This latter is probably because the finance needed for the establishment of a mosque us no longer forthcoming and so few new ones are being built. The fall off in the number and total value of endowments to the shrine in recent years corroborates this.[12]

A similar situation exists with respect to the 156 public baths in the city of which three only are in zone B. The explanation in this case is more simple - many of the houses of zone B have private bathrooms, and so the demand for public facilities is therefore low.

In summary it can be said that at the level of those functions (retailing and services) which are in contact with the customer, the difference

between the populations residing in the two zones have an important bearing on the location and representation of individual establishments. A type of central place system does exist, particularly in the old part of the city, but this is very much modified in the new town where the effects of social change are obvious and where demands are changing, causing an expansion in the numbers of certain shops and services, and a decline in others, all of which have implications for the location of the establishments and the structure of the central place hierarchy.

12. SUMMARY AND CONCLUSION

An attempt has been made to indicate the main trends that are taking place in the industrial and commercial structure of the city as two main influences - urban growth particularly with respect to increasing land values; and secondly economic development, especially the assimilation of technological advances, are profoundly affecting the life of the city. In general it is the technological advances which for most industries increase the possibility of functional specialisation in their organisation; and it is the increase in the price of land and congestion in the city which for some industries makes it mandatory for this functional specialisation to be expressed in a re-location of the separated functions on the ground. The most obvious net result of these two influences is the effect they have on the distribution of land uses in the city, and is summarised by the land use map (Fig.34) and the descriptions of chapter 14. No single generalisation can however effectually encompass the range of responses to the two main influences, which industrial and other functions seem to make.

For this reason, illustrative examples of industrial organisation have been developed - in textiles, brass and copper ware, carpets, footwear and jewellery, whilst wholesaling and retailing (and higher functions) were dealt with more generally.

The conclusion must be that whilst certain trends are well marked in the present day economic structure of the city, there are so many details and exceptions that a synthesis of them all into a general statement of economic development in the city is not possible at this stage, particularly as statistical data are lacking. Further evidence of a statistical nature is however reviewed in the next chapter which helps to rectify this situation.

Notes to text, and references

1. A Smith 'The Wealth of Nations' Vol.1. p.15 1776 Everyman's Library 412 London reprint 1957.

2. Chapter 15

3. B.F.Hoselitz 'Urbanisation and economic growth in Asia' Ec.Dev. and Cult. Change Vol.6 No.1. 1957 p.48.

4. Data provided by manager in discussions with the author.

5. Chapter 15.

6. O'Donovan 'The Merv Oasis' Vol.1. 1882 (quoted in this work, chap.4).

7. J.I.Clarke 'The Iranian City of Shiraz' p.27 Research Paper Series No.7. Department of Geography, University of Durham, 1963.

8. Chapter 15.

9. The system of shares varies a great deal in different parts of the country. It is discussed in great detail in Lambton, A.K.S. 'Landlord and peasant in Persia' New York, 1953.

10. Scharlau, K. 'Moderne Umgestaltungen im Grundriss Iranischer Stadte' Erdetunde 15, 1961, p.187.

11. The table is not a true measurement of the relationship between functions and the population total, since as seen, the existence of the pilgrim trade probably calls forth more establishments of some functions than would otherwise be the case.

12. Private communication to author from Head of Shrine Administration.

17. LOCATION of FUNCTIONS in the TWO CENTRAL AREAS, and on the FRONTS of MAIN AVENUES

1. Data and methods of analysis

(a) classification

(b) analysis of the four avenues

(c) analysis of the two nucleii

2. Results A. The Two Nucleii

(i) functional differences

(ii) effect of differing demand characteristics

B. The Four Avenues

(i) Main characteristics

(ii) Distribution along Balakhiaban

(iii) Distribution along Kh. Pahlevi

(iv) Distribution along Pain Khaiban

(v) Distribution along Kh. Tabarsi

3. Summary and Conclusion

The location of functions within the city has been considered industry by industry, in relation to economic organisation and other variables. It is now necessary, in order to complete the analysis, to examine location in various areas of the city, so as to determine the relationships (if any) between the location of functions, distance from central areas, and land values on the fronts of avenues. Some appraisal of the differences between the two nucleii in response to differences in the demand characteristics of the populations tributary to them, is also made here.

1. DATA AND METHODS OF ANALYSIS

In the main two sources of data are used in this analysis, the author's survey of 10,000 shops, and a second (pilot) survey of price in the two nucleii carried out by the author with the help of the Bank Melli, (these are more fully described in Appendix C.5 and 6)

The old city centre, (Fig. 35 and plates 26-28)

The new city centre, (Fig. 36)

Kh. Pahlevi

BalaKhiaban

Pain Khiaban

Kh. Tabarsi

The use of the Survey of 10,000 shops is described below, that of the pilot survey will be discussed later.

A. The Classification

Seven classifications of functions on the fronts of avenues were made, these are as follows :-

Plate 27. The old town centre, looking south east along the Faleki (road around the Harram).

Plate 28. The old town centre, looking west along the Faleki.

Function 1. (f.1) Producers, wholesalers, and producer-wholesalers - note that this does not include the very large areas of caravanserai behind the avenue and bazar fronts which are not included in this survey, and in which most production and wholesaling takes place.

Function 2 (f.2) Producer - retailers. Multifunctional units, as already discussed, rarely including some wholesaling.

Function 3 (f.3) Specialist retailing - distinguished by the fact that within Mashhad, the products which these specialists are selling are normally dealt with by the multifunctional units of function 2. These are the 'type 3' retailers of previous chapters.

Function 4 (f.4) Non-specialist retailers - selling goods which by definition are not manufactured, such as agricultural produce, or which are not as yet manufactured in Iran, but are imported in the state at which they are sold to the sonsumer - such as radios and electrical goods.

Function 5 (f.5) Servicing and other tertiary activities not yet covered, including hotels, tea houses, confiserie, all types of eating establishment, laundries, baths, masjids, banks, lodging houses, and all administrative offices.

Function 6 (f.6) The Residential function - apartments or houses.

Function 7 (f.7) Changing function, dereliction, and new building, as well as unbuilt frontage under speculation. This covers the conversion of a building from one function to another.

These functions were considered in terms only of their representation on the fronts of avenues. This avoids any measurements of area, which in the absence of an accurate cadastral survey, would be difficult, and no subjective or arbitrary decisions had to be taken about the distance back from the avenue-front to be included in the analysis.

It has been noted that along the main avenues and bazars of Mashhad, shops tend to be of equal size, a phenomenon inherited from early planning by Shah Abbas and others, which has become well established in the urban fabric in most areas of the city. The fronts of the avenues are thus divided up into similar sized units of 3 - 4 metres, with an average of about 3.3. metres (a figure arrived at by taking a small random sample of measurements), and this fact has been utilised in the survey. These frontal units were classified as above, irrespective of the product dealt in, or the type of ownership - whether each is separately owned, or several are combined together in one establishment.

B. Analysis of the Four Avenues

Each avenue was divided up into contiguous strata of theoretically 66.6 metres, starting at the point of highest land values, and including about 40 frontal units of an average of 3.3. metres each (20 on each side of the avenue). The total number of units in any particular strata is thus

about 40 on the ground floor, plus a number of others on higher floors, if these exist in that strata. The total thus varies from strata to strata.

Field observations in the city revealed no obvious pattern in the location of the seven functions. However, it was hypothesised that location would in some way be related to relative accessibility, represented by the nearness of a strata to a central point in the city (Harram, or Pahlevi-Khosravi), and to the value of land on the front of the avenue, (as shown in the map of frontal values, Fig.37). To establish the validity of this hypothesis, the frequency of each of the seven functions in each strata was first tested by chi-squared against the null hypothesis that there is no difference between the strata as regards the distribution of the seven functions, and the Yates Correction for small numbers was used, since many of the 'E' values were below five. The results of this, displayed in Appendix A, tables 15-17 indicate the percentage probability that the distribution of each of the seven functions from strata to strata along each avenue is a random one, arising from chance factors. The method is more fully described in Appendix B,2. The percentage representation of the functions in each strata was then calculated and plotted in figs. 43-46, the equations for which are to be found in Appendix A, tables 18-21, and where the distribution of the functions 1-5 had been shown by chi-squared to be other than random, regression lines were fitted (by least squares method) to determine the general trend of the distribution along the avenue. This was done however only in those cases where the distribution is obviously best summarised by a straight line - complex curves were not considered. Finally confidence limits were inserted indicating the range of possible variation of the observed values away from the regression line, at the

95% level of probability (see also Appendix A, tables 18-21).

C. Analysis of the two nucleii

The functional structure of the two centreswas examined merely by counting the number of frontal units occupied by each of the seven functions, in the two centres, and representing these as a percentage of the total (Table 44). The figures for the Harram area, the older centre, are however estimates, since a difficult political situation, and public alarm at that part of the survey [redacted] conducted in the bazars near the Harram, prevented the completion of the survey. A non statistical appreciation of the differences between the two centres in terms of the representation of different products and services was also made, in an attempt to gauge the effect of the demands of the differing tributary populations on the two centres. (Plates 27 and 28).

Differences in the quality of the products demanded and sold, and in price within particular product groups were thought to exist due to the contrasting demand characteristics of the two populations. A pilot survey of prices over a period of three months was carried out, using selected shops at 12 locations in the new, and old centres (see maps Figs.35 and 36). It was sometimes possible to define quite accurately the quality of the goods for sale, since some standardisation of product is now becoming evident in Iran. More often however, price differences are an expression of quality differences in the goods sold, in response to the differing utilities for the goods held by the two populations. To ensure comparability, the survey was carried out by the Bank Melli price recorder for Mashhad with whose work the

the shopkeepers involved were acquainted. The results (part of which are in Table 44A and B) whilst of heuristic value do not however have any statistical validity.

2. RESULTS - A. THE TWO NUCLEII

(i) Functional differences

The two nucleii share land values of roughly the same order (Fig.37) and differences between them in terms of functional structure are, as seen in chapter 16, partially due to the different product groups represented, and the extent to which these groups are characterised by functional specialisation. Table 44 indicates the relative proportions of the seven functions on the fronts of those main bazars and avenues indicated in figures 35 and 36.

Table 44

FUNCTIONAL STRUCTURE OF THE TWO CENTRAL AREAS in PERCENT
(FRONTS OF AVENUES AND BAZARS)

FUNCTION	NEW TOWN CENTRE	OLD TOWN CENTRE[1]
1. Producing and wholesaling	3.6	6.0
2. Producer-retailers	12.9	18.0
3. Specialised retailing	6.6	3.0
4. Non-specialised retailing	12.0	12.0
5. Services etc.	44.6(31.4)	40.0 (35.0)
6. Residential function	8.3	7.0
7. Changing function	7.5	9.0
8. Unknown	4.5	5.0
9. TOTAL frontal units	1434	3800

1. Estimates Figures in brackets represent the proportion taken up by commercial services only.

In general the new centre which does not have a legacy of the older vertical type of economic organisation is more specialised and perhaps more efficient and productive than the old centre whose systems as we have seen are still being adapted to fit modern economic conditions. Thus the old centre still has a fairly large proportion of producer-retailers (f.2) who make up 18% of the total, and survive due to inertia despite the pressure of increasing land values, rents and sargofli noted. The new centre has only 12.9% of its frontage in this function. Equally the old centre still has quite a few producers (f.1) in its many frontal sites - 6% of the total, compared to 3.6%in the new centre. These are chiefly in the less important, and more inaccessible bazars often cul-de-sacs where sargofli fall off quickly. This does not include of course the many producers and wholesalers (such as turquoise cutters and textile producers) who still operate in the caravanserai behind the fronts of the avenues and bazars. In the new centre, there are only three caravanserais, with the very few producers or wholesalers.

The new centre has more specialist retailers (f.3) than has the old centre, though the difference between the two (6.6% - 3%) is not large. The smallness of the difference is no doubt due to the fact that government administrative functions take up much of the frontal space in the new centre, reducing the frontage available for commercial functions by 13.2%. The comparative figure for the old cantre is only about 5%. The non-specialised retailers (f.4) appear to be roughly equally represented in the two centres.

Function 5(servicing and other tertiary functions) conceals a more complex situation than was at first envisaged. The new centre has a greater

proportion of servicing functions than does the old centre, but as seen 13.2% of the new centre's total frontage is occupied by public administration (included in function 5), and if only the commercial services - professionals, restaurants, hotels, transport facilities etc. are included, then the old centre has possibly more of its frontage in function 5, than does the new centre (35% and 31.4% respectively). This can be ascribed to the fact that the old centre is oriented to a greater degree around the pilgrim trade, and (Fig.35) much of its frontal, as well as interior area is taken up by lodging houses, hotels, tea houses and restaurants which serve the many pilgrims.

Residential land use on the fronts of avenues (f.6) forms quite a large proportion of the total in both central areas, being slightly higher in the new centre. This function (f.6) is almost entirely located on second stories and above, where apartments are common interspersed with offices, hotels and doctor's or dentist's surgeries. The figures of table 44 may however be midleading, for much of the residential space of the old centre is occupied by pilgrims on short leases, up to about 6-8 months, and perhaps should be classed as a servicing function. Moreover much of the present frontage occupied by hotels, and lodging houses, and classified as such is a conversion from former residential land use. In the new centre on the other hand, apartments, with longer leases, and even private houses are to be seen on the avenue fronts, usually at first floor level.

Frontage which is changing function (f.7) is partially a reflection of the residential functions discussed above. As pressure on land in these central areas increases, the residential function is usually replaced by functions of a

Plate 29.

First floor dereliction and re-building, Bala Khiaban.

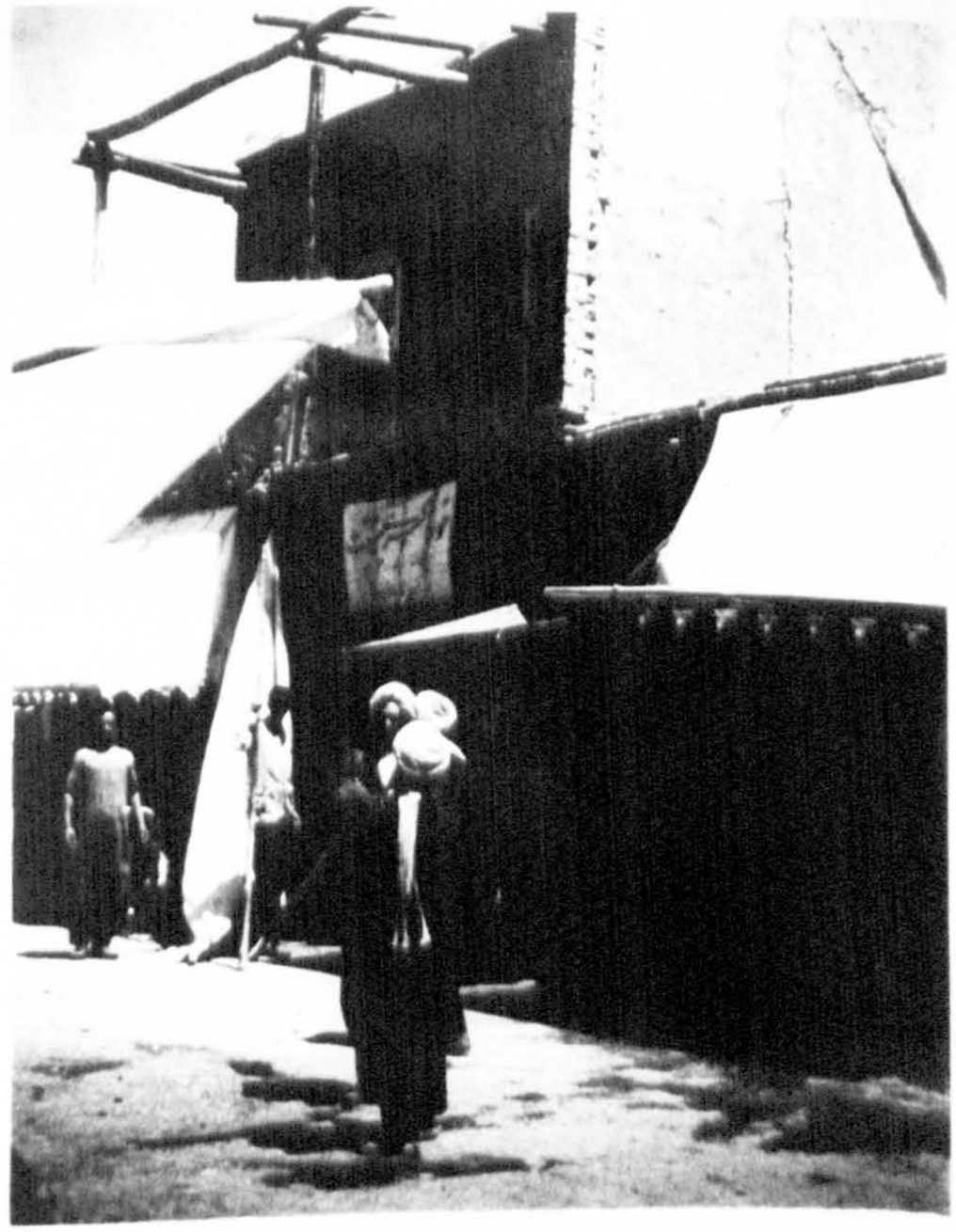
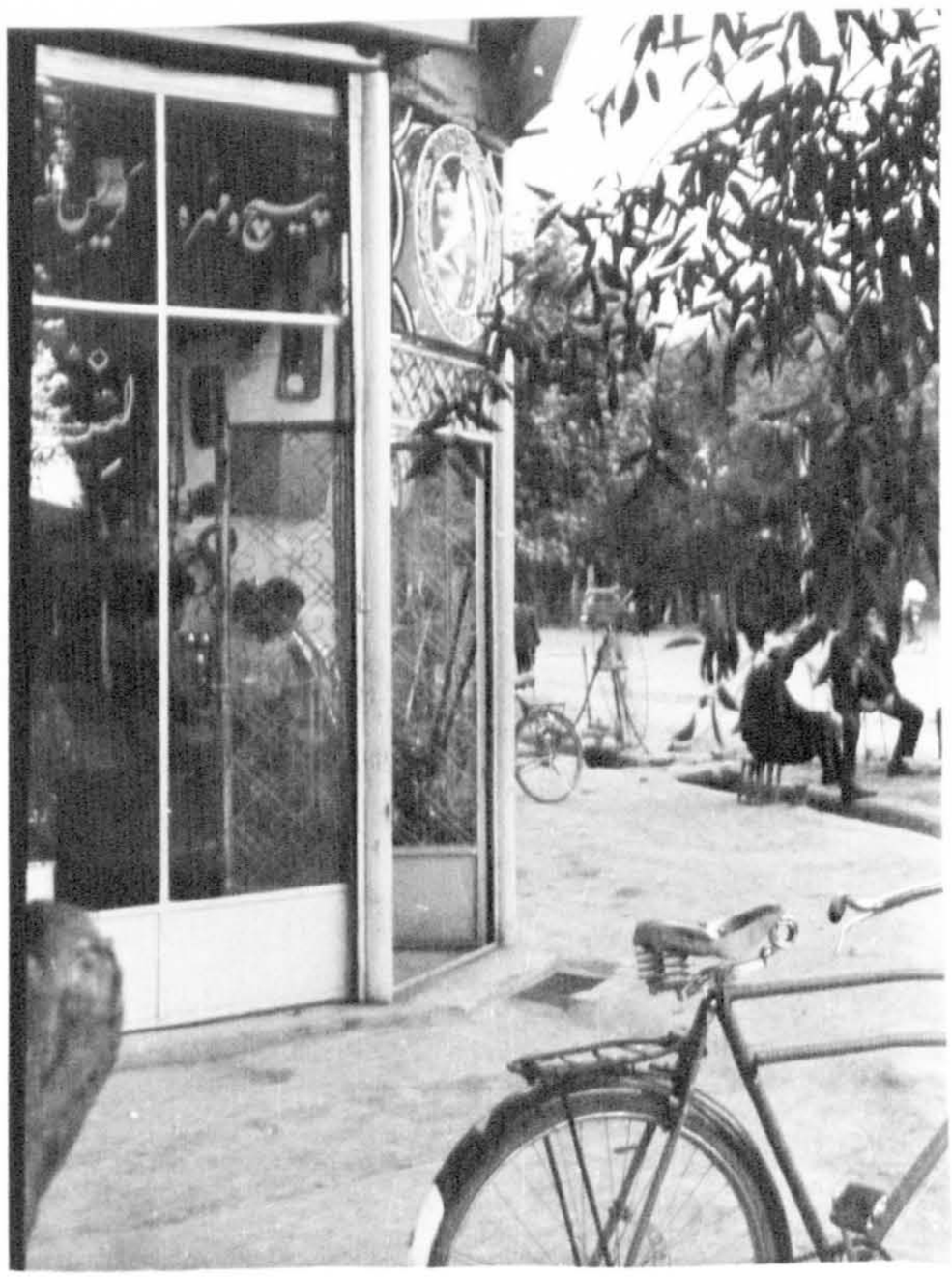


Plate 30.

A shop in the new town centre.



higher order, andit is this change which is recorded as function 7. More of it is evident in the old centre than in the new, as first floor apartments are converted, or dismantled and replaced by hotels and offices, built over the shops below (Plate 29). Complete rebuilding, up to four floors, and replacement of housing by offices available to lessees is more common in the new centre, especially along Kh. Pahlevi. In this latter avenue, some of the second floor frontal units are being taken over by the shops below, which being on the whole more specialised than their counterparts in the old centre are growing in size, and need more storage space.

(ii) <u>The effects of the differing demand characteristics on the two nucleii</u>

This can be considered at two levels - the effect on the represnetation of different product groups, and therefore shops in the two centres, and at a more detailed level, the effect on the goods sold within one product group. Morphologically there are also obvious distinctions. In the Harram area and the bazars, shops still tend to be of the old type, totally open at the front, floor to ceiling, and wall to wall, and equipped with heavy wooden shutters or a roller-steel blind, which is thief and riot proof, reflecting the insecurity of this part of the city. (Plate 25) In Pahlevi and Khosravi the 'smart' shops are plate-glass fronted with an entrance offset to one side, and have a display of goods, even jewellery in the windows, whilst the shops are fitted with counters, and other furnishings. (Plate 30). A type mid-way between the two centres, where glass-fronted display windows are fitted with rollers so that they can be pushed forward during the day time, and withdrawn behind a steel roller blind at night time, or in times of

insecurity - a compromise between the old and the new.

The two centres differ in more fundamental aspects however. We have seen for instance (Chapter 16) that there are many jewellers shops in the new town centre, but few carpet shops. The higher incomes of the western part of the population which create demands for products of high value and low utility, are most probably responsible for the fact that out of the 30 radio and radio-spares shops in the city 22 are located in the new town centre. Other examples of this are plentiful. The old town centre for example has a thriving second-hand clothes bazar, and a collection service for old clothes is organised within it. Most of these discarded garments are collected in the west of the town, but sold in the bazar of the old town centre. There are for example on the length of Kh. Pahlevi, on which the new centre is based, only two tea houses. Instead there is proliferation of shops and pavement traders selling soft drinks and ice-cream, and confiserie, in which women are socially accepted - much as in the café in Europe. It seems in this case that the higher income and wider experience of the population living in the west of the twon create more sophisticated demands, and the structure of the central area responds to these demands, as tea houses are replaced by confiserie. In the old centre, the tea house, an exclusively male preserve, is still the main public social meeting place, where tea is still the main beverage, though soft drinks are sometimes available.

Indeed the freer social atmosphere of the western area, a society in which women have a more important position, means that demands for goods and service specifically for women have an effect on the shops of the new town

centre. There are for instance only eight registered womens' hairdressers in the city - all located at the junction of Pahlevi and Khosravi on the first floor level, alongside which stand dress shops and shoe shops specifically for women, none of which are to be found in the old town. Equally obvious are the eight cinemas, and one theatre all on or near Kh. Pahlevi (see fig.36) located where social freedom allows them to be so. These serve the whole population however, not just that of the western side of the city.

Less obvious but perhaps more important are the differences which arise between the two centre, within a product group. An example of this - the sale of fruit, has already been discussed (Chapter 12). Better quality fruit is on sale in the shops of the new town centre in response to more exacting demands, arising from the higher incomes and lower utilities of the western population, whilst in the old town centre fruit remains unsorted and ungraded, and in the prevailing demand - conditions of lower income and higher utility, is sold at lower prices. Since, as we have seen, the two populations have quite different demands, and structures of expenditure, then by implication one might expect there to be price differentials between the two centres, within a product group - differentials which are an expression of di fferences in quality, or type of product. The pilot survey of price was an attempt to gather data in support of this hypothesis, and whilst it is not possible to make valid statistical inferences from this pilot survey, it is of some value. Tables 45, A and B, give mean prices of products at the locations in the two centres, for the months of Ordibehesht and Tir 1343 (May and July 1964), as an illustration. The price differences are not large, and whilst they might indicate generally higher prices, particularly for food items, in the Pahlevi area, firm conclusions

Table 45A Mean Price Variations in the two central areas. Ordibehesht, 1343 (May 1964)

PRODUCT	A - OLD CENTRE						B - NEW CENTRE						MEANS	
	1	2	3	4	5	6	7	8	9	10	11	12	A	B
Potatoes (Kilo)	13	-	12	12	13	-	14	13	-	12	-	-	12.3	13.0
Mast (A) (Kilo)[a]	-	12	11	11	-	12	-	13	12	13	13	-	11.5	13.0
Rice (2) (Kilo)[b]	-	21	22	-	20	21	-	21	20	20	19	-	21.0	20.0
Ghee (K) (Kilo)[c]	170	-	-	160	170	-	175	165	-	160	-	175	166.6	168.7
Mutton (Kilo)	-	64	62	-	62	-	-	65	62	63	-	63	62.7	62.3
Tea glasses (6)	-	15	15	15	15	-	-	12	-	13.5	-	14	15.0	13.2
Samovar (Fili)	-	530	-	-	550	-	-	200	-	800	600	-	540.0	700.0

a. Yoghurt, grade Ala

B. Iranian rice, grade 2

c. A type of butter made from mast, for cooking - grade Kermanshahi

Source - Pilot Survey of Price, 1964

For locations, see maps of central areas (Figs.35 and 36)

Table 45B

Mean Price Variations (in rials) in the two central Areas. TIR 1343 (July 1964)

Product	A - Old Centre						B New Centre						Means	
Locations -	1	2	3	4	5	6	7	8	9	10	11	12	A	B
Apples (Kilo)	17	-	14	-	17	-	18	-	18	18	15	15	16.0	17.4
Cucumbers(Kilo)	3	-	2.5	3	2.5	2.5	3	2.5	3	-	3	3	2.7	2.9
Apricots (Kilo)	10	-	12	10	-	11	12	-	-	13	10	10	10.7	11.2
Potatoes (Kilo)	10	8	-	8	10	8	9	9	9	-	9	10	8.8	9.2
Beans (Kilo)	6	-	6	6	6	-	6	6	6	-	6	6	6.0	6.0
Mast (A) (Kilo)[a]	13	8	-	12	-	13	13	-	13	13	12	-	11.5	12.7
Cheese (Shir)[b]	5	-	5	5	5	-		5	5	5	5	-	5.0	5.0
Eggs (1)	-	3	3	3	3	3	3	3	3	3	3	3	3.0	3.0
Butter (Sir)[c]	-	11	-	11	11	11	11	12	12	11	11	12	11.0	11.5
Mutton (Kilo)	-	-	63	60	-	62	-	-	63.5	-	62.5	-	61.7	63.0
Beef (Kilo)	-	37	-	-	-	-	35	-	35	35	-	-	37.0	35.0
Cotton print(1.m)[c]	17.5	-	18	20	-	-	-	22	20	20	-	-	18.5	20.7
Tea glasses (6)	18	15	-	-	-	-	13	13	-	-	13	12	11.5	12.7

a - Yogurt, grade Ala

b Sir - about three ounces

c. grade and style defined

For location, see maps of central areas (Figs. 35 and 36)

Source - Pilot Survey of price, 1964

cannot be drawn, for it is possible that the variance in price within each of the two centrs is much greater than the variance between the two centres. However, due to the short-time period over which it was possible to collect the data (a period of three months) and a generally unsatisfactory statistical base, further statements as to detailed differences between different types of products are precluded. Quality is generally better and prices may well be higher in the new centre whilst a range of goods and services available in the new town in response to higher and more sophisticated demands, is not available in the old town. A detailed analysis of the situation would however require a much longer period of data collection, over a much wider sampling range.

Results B- THE FOUR AVENUES

Between, and away from the two main central areas run the large boulevards created by Reza Shah, lined by shops and other establishments on both sides. The procedure used in the analysis of the functions along these avenues has already been outlined, and an appraisal of the results summarised in Figures 43-46 is now in order. In the discussion on land values in the city, it was shown that frontal values decrease outwards from the two centres, along the main avenues towards the periphery of the city - in general related directly to accessibility. In the figures (43-46) land values thus decrease from left to right for Kh. Tabarsi, Balakhiaban, and Pain Khiaban, and for Khiaban Pahlevi, they increase towards the centre, and then decrease again beyond it. Unfortunately the available data on land values are not sufficiently comprehensive for this to be shown statistically, but the trends are clear from the map of land values (Fig.37). For each avenue, the analysis

Table 46 PERCENTAGE DISTRIBUTION OF FUNCTIONS ON THE FRONTS OF FOUR MAIN AVENUES

FUNCTIONS	E. BALAKHIABAN		W. BALAKHIABAN		PAIN KHIABAN		KHIABAN TABARSI		KHIABAN PAHLEVI	
	A All Floors	B Ground Floor	A All Floors	B Ground Floor	A All Floors	B Ground Floor	A All Floors	B Ground Floors	A All Floors	B Ground Floors
1 Producing & whole--saling	8.1	12.2	15.1	26.8	9.4	11.3	5.4	7.7	1.3	1.6
2. Producer-retailers	15.3	24.2	13.8	17.2	15.6	22.8	17.8	23.2	12.3	16.6
3. Specialised retailing	5.2	9.1	4.0	2.8	4.4	6.1	3.0	4.5	4.4	6.8
4. Non-specialised retailing	16.2	25.1	21.7	17.3	30.5	45.1	18.3	27.4	9.8	15.6
5. Services etc.	25.0 (20.2)	16.0 (12.0)	14.7 (13.9)	14.1 (13.1)	8.8 (8.4)	8.9 (8.1)	26.8 (22.0)	27.7 (16.8)	50.8 (42.7)	39.4 (33.5)
6. Residential function	11.5	4.4	13.6	10.5	12.4	0.2	11.0	2.2	9.7	9.2
7. Changing function	15.0	3.8	12.0	4.7	13.8	1.0	9.5	9.7	8.2	7.2
8. Unknown	3.7	5.1	4.9	6.6	5.0	4.7	8.2	7.7	3.5	3.6
9. Proportion above ground floor	38.1		19.6		31.8		33.0		34.3	
10. Total frontal units	1013	625	796	640	724	594	736	493	1351	887

Figures in brackets indicate the proportion of commercial services

was carried out in two stages, first for all frontal units and second for frontal units on the ground floor only, since there are important functional distinctions between the ground floor and subsequent floors.

(i) The Main Characteristics of the Avenues

These are best seen at the ground floor level, with the aid of the table of means (Table 46). Kh. Pahlevi, which forms part of the new town nucleus discussed above, is dominated by the servicing function, and has also a relatively high proportion of specialised retailers, though few producer - retailers, indicating a high degree of functional specialisation along it. Only 16% of the total frontal units are occupied by function 1 - producing and wholesaling. In complete contrast to this is the western end of Balakhiaban, beyond Meidan-i-Shah, which is removed from the influences of both nucleii. This street is chiefly one of wholesaling and production (26.8%) and of non-specialised retailing (21.7%) whilst, reciprocally, the proportion of the total occupied by the servicing function is low (14.1%). The eastern part of Balakhiaban, between Meidan-i-Shah and the Harram has many specialised retailers (9.1%) as well as producer-retailers (24.2%) and non-specialised retailers (24.2%), whilst other functions including production and wholesaling, are subsidiary to these three.

Pain Khiaban has many producers and wholesalers (15.3%) but is chiefly dominated by non-specialised retailing which occupies 45.1% of the total frontal units on the ground floor. All other functions, excluding the producer-retailers (22.8%) are very much subsidiary to this one. Khiaban Tabarsi running north from the Harram has a similar sort of distribution of

functions to Pain Khiaban, but to less extremes. Here 27.4% are non-specialised retailers and 23.2% producer-retailers. The servicing function is also important, with 17.7% of the total, but there are few units of function 1 (7.1%) on the avenue.

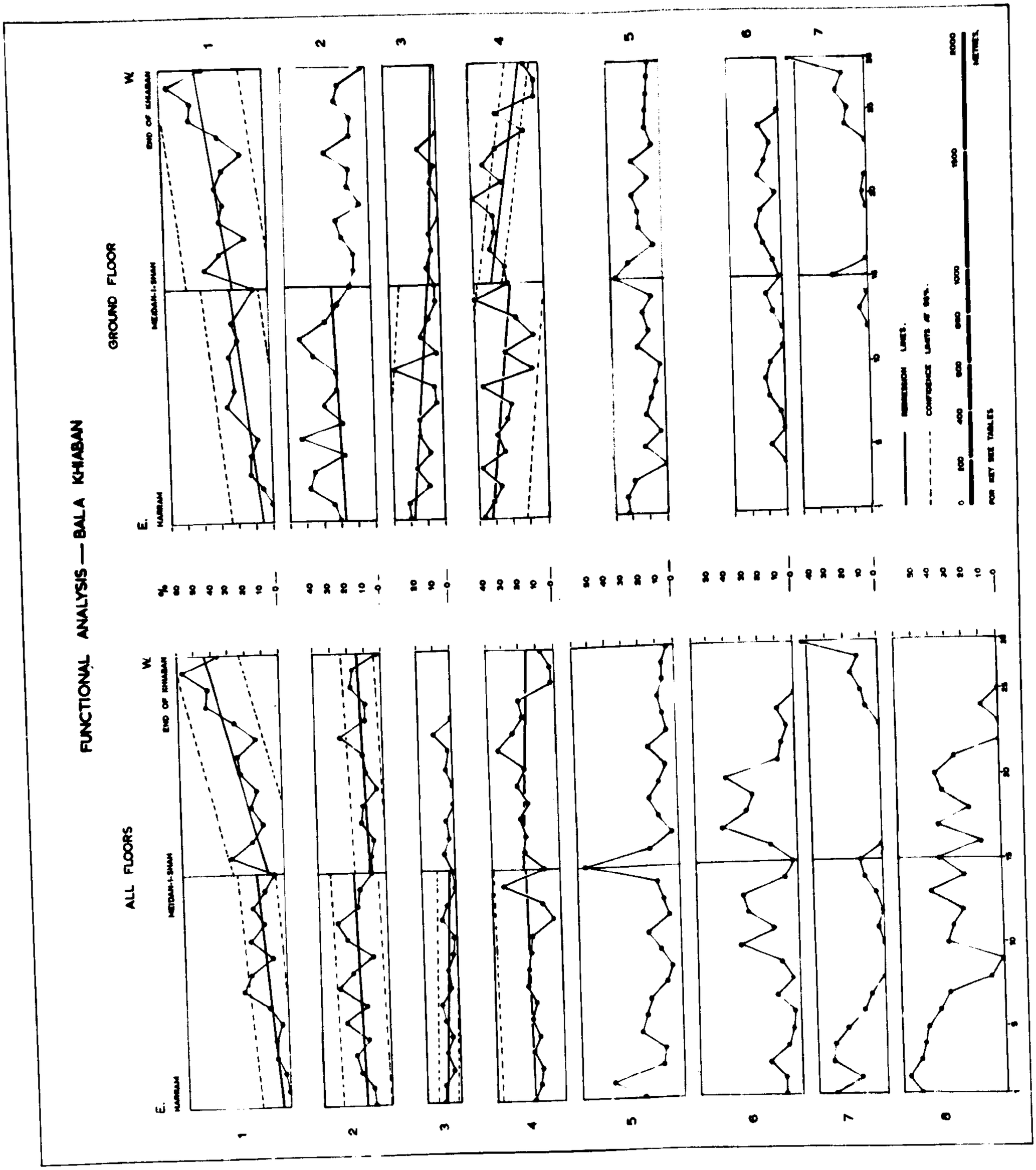
If all floors are considered the situation is much the same except that in all cases the proportion taken up by function 5 (servicing) and by function 6 (residential) increases. This is because first and subsequent floors if any are occupied by offices, hotels and lodging houses, and apartments. Reciprocally all other functions decline in proportion though their order of importance is not modified much. The extent of the modification is dependent on the proportion of the total functional units that are above ground floor level - highest in Balakhiaban near the Harram, and in Kh. Pahlevi, and lowest in Balakhiaban west of Meidan-i-shah, and in Pain Khiaban.

(ii) <u>The distribution of functions along Balakhiaban (Fig.43)</u>

The chi-squared test carried out on functions 1 to 5 shows that most of the distributions along Balakhiaban, both east and west of Meidan-i-shah, are sufficiently deviant from the null hypothesis for there to be some influence determining their distribution. (See Appendix A table 15). The eastern and western sections were tested separately, though the strata at Meidan-i-shah was included in each.

The graphs (Fig.43) show that in both ground floor and all floors cases, for both eastern and western sections, the proportion of the producing and wholesaling functioh (f.1) increases very abruptly with distance from the

Fig. 43.


FUNCTIONAL ANALYSIS — BALA KHABAN
GROUND FLOOR
ALL FLOORS
W.
E.
END OF KHABAN
MEIDAN-I-SHAH
KARKAN
1
2
3
4
5
6
7
8
%
REGRESSION LINES.
CONFIDENCE LIMITS AT 95%.
FOR KEY SEE TABLES

Harram, at which it is not represented. This is an inverse relationship to land values. For the producer-retailers (f.2) in three cases out of four, the distributions observed are only marginally significant, and for the case which is significantly deviant from the null (ground floor, eastern section) the resultant regression line is almost horizontal, and therefore inconclusive. It would appear then that function 2 has no real relationship to land values, or accessibility (distance from the centre).

The curves for function 3, specialised retailing, are all significant except for the ground floor case of the western section, for which on suspects the total numbers recorded are far too small to be considered effectively by the chi-squared test. However, there appears to be some discrepancy between the curves as they appear in the all floors graph, and those of the ground floor graph. In the latter case, there is general decline in the proportion of specialist retailers, away from the Harram. This implies that specialisation by function in space is related in a negative ratio to distance from the centre and the increase in land values and rental demands. If the all floors case however, whilst the 'y' values are negative (indicating a decline) the slope is so small as to be considered a trend of no significance. It is clear however that towards the Harram, the incidence of upper floor units increases and since no retailers has been observed above the ground floor, this is sufficient to explain the discrepancy between the curves, and it is reasonable to maintain that specialist retailing decreases in proportion with distance from the Harram.

For the servicing function (f.5) the distribution is significant only in one case - the all floors graph of the western section. However all

hotels and lodging houses, which make up a large proportion of the units of function 5, are, in Bala Khiaban, located on upper floors, and so the distribution of the service function is at least partially related to the incidence of upper stories. This is qualified by the fact that the distribution of function 7 (changing functions) is also mainly in upper floors. There are moreover no hotels or lodging houses on any floor west of the junction of Balakhiaban with Kh. Shah Reza (Strata 8). All this is reflected in the curve of function 5 for all floors, which apparently declines west of Meidan-i-shah. However this is slightly misleading in that the high peak which occurs in the function 5 graph at Meidan-i-shah is merely a reflection of the fact that the square is a planned administrative centre in which the municipality (a four storey building) and other offices are located. The distribution of the service function on the ground floor is more correctly that of all services except hotels and lodging houses - including tea houses, restaurants, laundries etc, but appears not to have any simple linear relationship with distance from the Harram.

The residential function (f.6) also bears a close relationship to the distribution of upper floors and few apartments and houses are on the ground floors. The trend in the all floors graph would seem to be an increase towards Meidan-i-shah, and a decrease away from it, so that there is an inverse relationship with land values as far as Meidan-i-shah and then a direct relationship beyond it. This may be because the price of land near Meidan-i-shah reaches the maximum for the residential function and increases towards the Harram, whilst further west than Meidan-i-shah, although prices

are lower, there are fewer two storied buildings, and many producing and wholesaling units, an environment which is discouraging to the residential function.

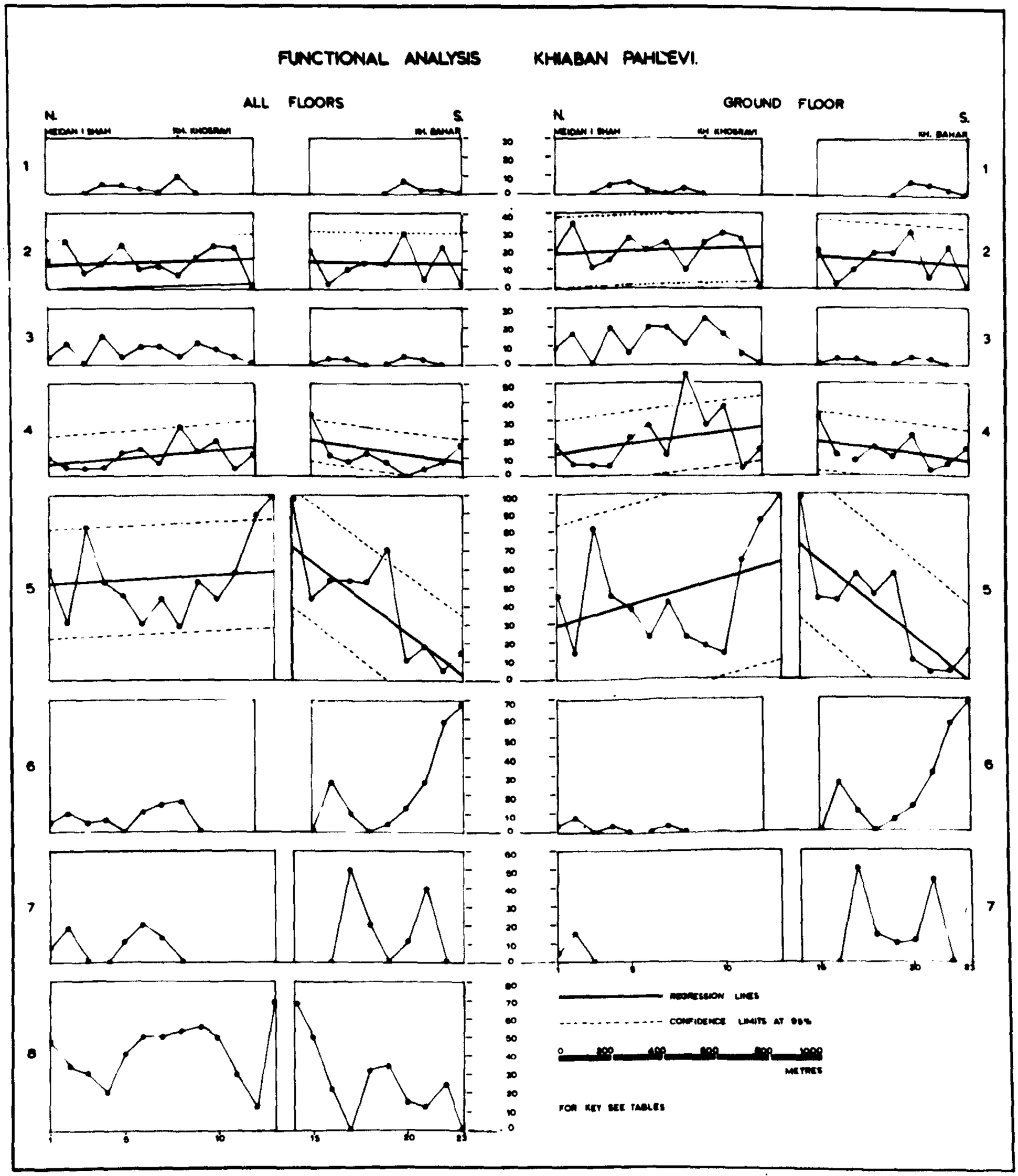
Much of the frontage which is changing function (f.7) is a conversion of second stories from residential use to hotels and offices, and for this reason is located close to the Harram where rising land values are forcing the residential function out. Up to 30% of strata 1-4 are being rebuilt at least in the upper stories. The rise in the proportion of changing function at the extreme western end of Balakhiaban is due to new buildings, not yet occupied. The survey was carried out in 1963, at the end of a building boom in which there were many new premises built but unleased. This was partially due to developers and speculators witholding leases until rents climbed higher - a situation which was common in many parts of Mashhad up to the end of 1964.

In summary, it appears that the location of most of the functions along Balakhiaban is related to distance from the Harram and differential land values. Lower order functions such as producing, wholesaling, (f.1) and residence (f.6) appears to have an inverse relationship with land values, whilst those of a higher order, particularly specialised retailers (f.3) and the services (f.5) have a direct relationship to the latter. Location is thus explicable in terms of accessibility and the resultant value of land.

(iii) <u>The distribution of functions along Khiaban Pahlevi (Fig.44)</u>

The functional structure of Pahlevi is dominated by the fact that its middle section is part of the new town centre, and contains the main administration area of the city, based on the site of the Arg. Land values

Fig. 44.


FUNCTIONAL ANALYSIS KHIABAN PAHLEVI.
ALL FLOORS
GROUND FLOOR
N.
S.
MEIDAN I SHAH
KH. KHOSRAVI
KH. BAHAR
1
2
3
4
5
6
7
8
REGRESSION LINES
CONFIDENCE LIMITS AT 95%
0 200 400 600 800 1000
METRES
FOR KEY SEE TABLES

decline north and south of this area, and the avenue thus forms a cross section across the new town centre. There is however a gap in the buildings of the avenue occupied by the city park, which is represented at less than true scale in fig.44.

Frontage occupied by producers and wholesalers (f.1) is almost negligible in Pahlevi and no trends in the location of this function are detectable. The distribution of producer-retailers (f.2) is by the chi-squared test significant in three out of four cases in the diagram, and the regressions indicate an increase in the proportion of producer-retailers towards the centre of high land values - a situation similar to that observed in Balakhiaban. The relatively large proportion of producer-retailers in the centre (strata 11,12,15 and 16) is partially due to the fact that many of them are high class tailors and jewellers, who can withstand high land prices, and for whom because of the nature of their product (high value/low bulk) the pressure towards functional specialisation is not so great.

The distribution of specialist retailing (f.3) is significant by chi-squared in the northern part of the Khiaban only. In the ground floor graph the incidence of this function is seen to increase abruptly towards the centre, whilst the slight negative relationship in the all floors graph shows the absence of any type 3 retailers in the upper stories. As in Balakhiaban, this steep increase is to be interpreted as evidence in support of the contention that functional specialisation is on the whole more developed in areas of high land values, from which lower functions are

excluded. In the case of the non-specialised retailers, (f.4) the trends are clear in all the diagrams, with an increase towards the centre both from North and South, and in all floors and ground floor cases. These retailers are a fairly high order function and can benefit from location in a central area by having access to a large amount of customers. The fruit and vegetable shops and groceries which largely make up this function tend to be of larger size and high quality, especially in the central parts of the avenue.'

The high values of chi-squared which are attained by the distribution of the service function(f.5) and the steep regression lines which summarise the distribution are of course influenced by the fact that the two central strata (13 and 14) of the avenue consist exclusively of the servicing function, since the whole frontage is occupied by public administration - G.P.O, Police H.Q., Bank Melli, etc. It is incidentally for this reason that strata 13 and 14 have been omitted in the diagram of the other functions. Yet even without this situation, the regressions would still slope quite steeply down away from the centre. The great importance of this high order function in the structure of the avenue is fully evident.

There is little of the residential function (f.6) in Pahlevi, except at the southern end near the junction with Khiaban Bahar where in the last strata (23) over 60% of the total frontage is residential in function. However unlike Balakhiaban, the incidence of the residential function is not related simply to the occurrence of upper stories - indeed in the most southern

strata where the residential function is so dominant, upper stories are non-existent. The lack of the residential function in the northern part of the Khiaban, near to Meidan-i-shah is difficult to explain, since the latter represents a maximum point in the distribution of the residential function along Balakhiaban. Indeed in Pahlevi generally, the inverse relationship between land values and the residential function found to be strong Balakhiaban, is somewhat blurred.

The frontage in which functions are changing (f.7) does not appear in Pahlevi at the point of highest land values (as it does in Balakhiaban) in which high order functions have long been established. Instead the maximum points on the graph of function 7 are to be found north and south of the centre where conversion of the few remaining residential frontages into commercial premises is taking place. Some new building causes other peaks in the graph. Changes in the south, where the residential function is still dominant, are few, or non-existent.

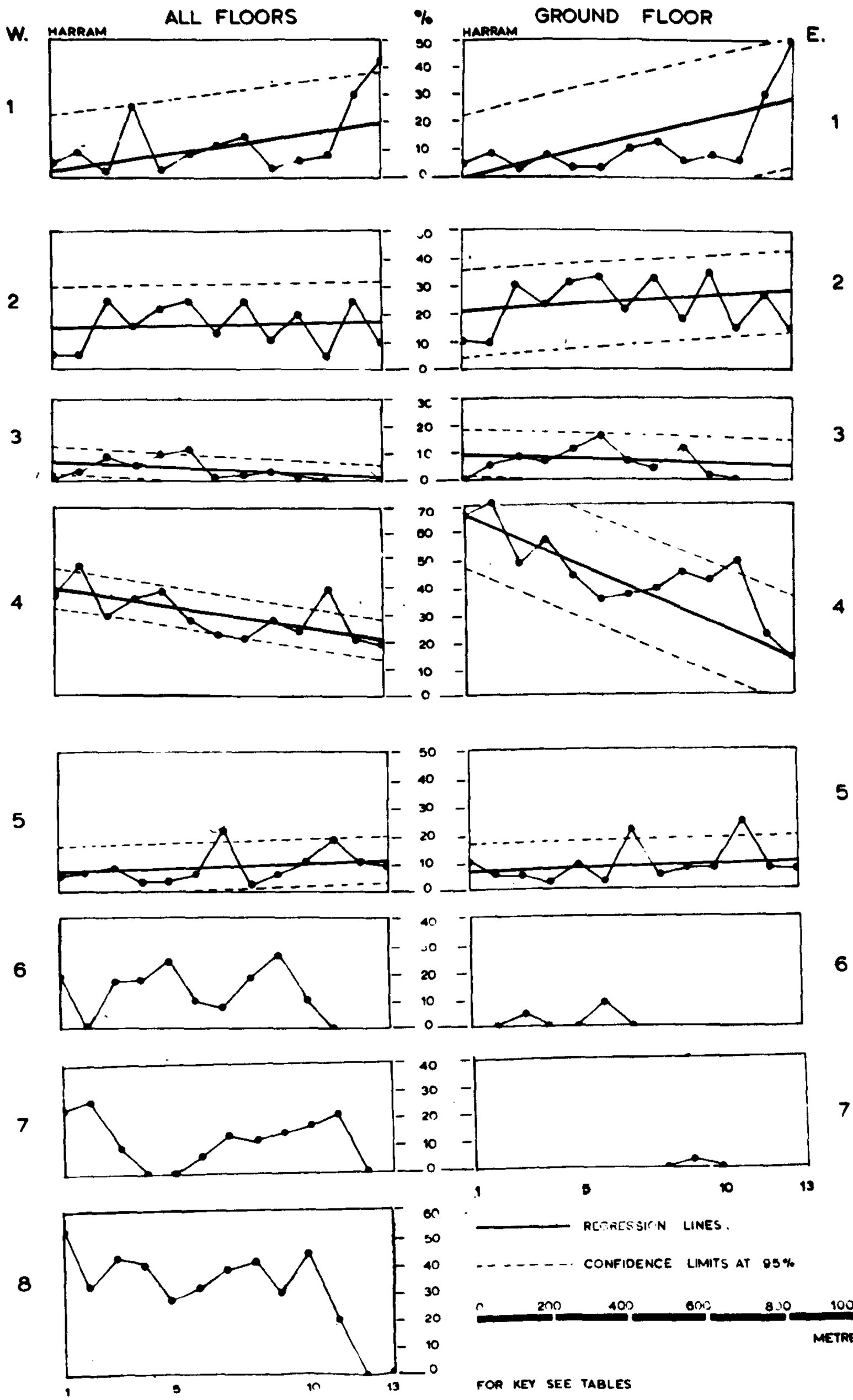
A relationship between functional distribution and land values is evident on Pahlevi but is slightly different from that along Balakhiaban due to the extremely high land values and great accessibility of the new town centre. The proportion of wholesalers and producers (f.1) is very low, whilst that of servicing (f.5) is correspondingly much higher, and producer-retailers (f.3) survive in the centre because of the special nature of their activity. Trends are otherwise similar to those of Balakhiaban, with low order functions inversely, and high order functions directly related to land values.

(iv) <u>The distribution of functions along Pain Khiaban</u> (Fig.45)

The producers and wholealers (f.1) of Pain Khiaban have a highly significant distribution increasing in proportion away from the Harram as the value of land decreases. The regressions are steep, perhaps tending towards an exponential in the ground floor cases. The producer-retailers (f.2) seem to be fairly randomly distributed in Pain Khiaban and only one of the chi-squared values is even marginally significant. This lack of trend in function 2 has been observed both for Balakhiaban and Pahlevi, but is here much more noticeable. It would seem that it is only at the junction of Pain Khaiaban with the Harram (strata 1 and 2) that land values and rents are high enough to discourage functional diffuseness, and the values for producer-retailers fall from about 20-25% to about 5% of the total. Elsewhere in the Khiaban, producer-retailers are able to survive.

The number of specialised retailers (f.3) is low, but their proportional distribution is extremely significant, and there is as on Balakhiaban and Pahlevi a decline in frequency with distance from the centre, and with declining land values. Again the implication is clear - that functional specialisation is greatest where land values are high enough to force functions to be split up - the sudden fall in the proportion of the multi-functional producer-retailers, mentioned above corroborates this. Pain Khiaban is however above all an avenue of the non-specialised retailer (f.4) selling chiefly agricultural products of various types. The proportion of this function declines with distance east from the Harram, and again is related in a direct ratio to the distribution of land values, and to relative accessibility. The trends are strong and the variation so small

FUNCTIONAL ANALYSIS —— PAIN KHIABAN



that the confidence limits are acceptably narrow.

The distribution of the service functions (f.5) along the avenue is marginally significant by chi-squared in both ground floor and all floor cases, and the regression shows that there is an increase in frequency away from the Harram - that is a negative relationship between servicing and land values. This is contrary to what one might expect, and is in complete contrast to the situation in Balakhiaban and Khiaban Pahlevi, the explanation of which lies in two directions. First many of the servicing units are in fact tea-houses and small eating houses whose chief customers are the workers in the caravanserai, and the rural visitors who come to sell produce in the market that sometimes develops at the eastern end of Pain Khiaban. Because of this servicing units are located towards the eastern end. Second, much dereliction and disused property exists at the east end of the avenue (seen in chapter 14) and this, as it becomes empty is quickly occupied by poor pilgrims and temporary in-migrants, at least in the summer time, when this survey was carried out. The derelict areas thus take on a lodging function, and are by this means classified under function 5. These derelict areas and therefore much of the lodging function are chiefly in the lower land value areas at the eastern end of the Khiaban, and it is for this reason that function 5 increases eastwards, and bears an inverse relationship to land values. This also explains why the graph of changing function (f.7) does not extend to the extreme eastern end of the Khiaban, for much of the dereliction and changing function is already classed under function 5.

The residential function (f.6) is related, it appears, only to the

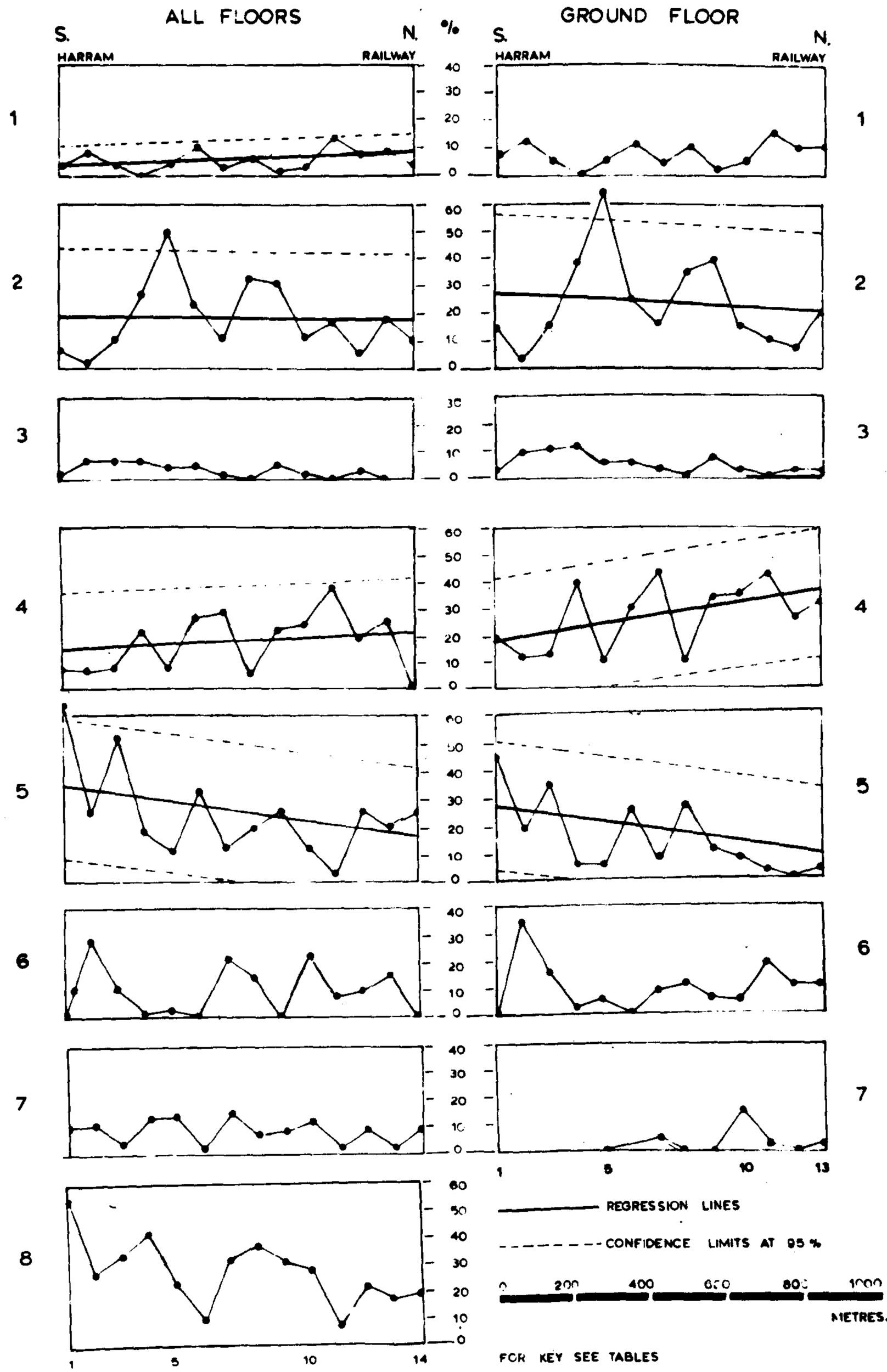
incidence of upper stories since on the ground floor graph its occurence is negligible. The sudden decline in the residential occupance of the first storey in strata 3 - 5 is no doubt due to the sudden increase in the proportion of function 1 (producers and wholesalers) in the same strata. First floors are here occupied by cotton and woolen weavers, and some cloth dyers, who retain this location despite the high land values, as a relic of the former vertical organisation of the economy and who are close to other dealers in textiles, in the nearby caravanserai. This is a form of industrial inertia.

The general relationship between distance from the centre, land values, and the location of functions, is again borne out here, but there are some important exceptions. These, such as the reversal in the trend of servicing functions, and the continuation of the producing function in second floors quite near to the Harram, are remnants of the older systems of location based on vertical organisation, and the product group, in which distinction between functions was unimportant. It is significant that this should still exist in the old town, where older systems are sometimes preserved despite modern pressures.

(v) <u>The distribution of functions along Khiaban Tabarsi</u> (Fig.46)

Here there are 14 strata in the all floors diagram, but only 13 in the ground floor diagram since the last strata has so few functional units (only 14) on the ground floor that statistical interpretations are not possible. There are relatively few producers and wholesalers (f.1) on Tabarsi, and their distribution departs from the random only marginally. The all floors graph, the chi-squared value of which is significant appears to indicate a slight increase away from the Harram.

FUNCTIONAL ANALYSIS —— KHIABAN TABARSI



FOR KEY SEE TABLES

Producer-retailers (f.2) have a distribution which according to the chi-squared test could hardly have arisen by chance, yet their distribution does not seem to have a definite trend along the avenue. Their location seems to be somewhat influenced by the occurrence of upper stories suggesting that many producer-retailers have upper floor premises (at least for their producing function). This is borne out when we see that thelow frequency of producer-retailers in strata 1 - 4 near the Harram, occurs reciprocally with an increase in the servicing function. This implies that the upper floors used by the producer-retailers in the north and centre of the avenue are taken over by hotels and lodging houses and other service functions as the value of land and rents rise in the south, near the Harram. If any trend does exist in the distribution of function 2 it would seem to be a decline away from the Harram - a direct relationship with land values.

The low proportion of frontal units of function 3 (specialised retailing) does not permit statistical analysis, as the low value of chi-squared indicates. This function would seem however to decline northwards, once again in a direct relationship with land values, as observed in the other three avenues analysed. However the non-specialised retailing function (f.4) has a distribution in complete contrast to the situation in the avenues so far discussed. Here the proportion of function 4 increases away from the Harram, bearing an inverse relationship to land values, which for a high order function, is difficult to explain. It may partially be due to the vegetable retailers located in the north of the Khiaban - but these are relatively few in number, and the full explanation must lie elsewhere.

Function 5 (servicing) in both ground floor and all floor cases decreases away fromm the Harram and as in all the avenues discussed is related directly to land values. Although little hotel accommodation is to be found in this avenue, most of it is within about 250 metres of the roundabout around the Harram (strata 1 - 4) and almost all in upper floors, including one hotel of five storeys, the tallest building in the city. Neither the residential function (f.6) nor those frontages changing function (f.7) appear to have any particular linear relationship with distance from the Harram, or land values, though the sudden rise in the curve of function 7 near the Harram is due to conversion of existing property, and to some new building.

As in Pain Khiaban, Khiaban Tabarsi has several important deviations from the general rule of location in direct or inverse relationship to land values, such as the reversal in the trend of non-specialised retailers, and lack of trend in some functions such as the distribution of producers and wholesalers, and producer-retailers.

An explanation of this in terms of exceptions to the general rule is not satisfactory, and it may well be that as in Pain Khiaban, there are relics of an earlier type of distribution, based on different criteria which the present survey was unable to detect.

SUMMARY AND CONCLUSION

Evidence has been presented to show that:-(i) The functional structure and the representation of product groups and services in Mashhad's two central areas of high land values is partially dependent on the demand characteristics

of the population tributary to the two areas, and partially on the inheritance of certain functions from an earlier period.

(ii) In general the location of functions along the main avenues of Mashhad is related to the distribution of land values. High order functions have a direct relationship, low order functions an inverse relationship. However -

(iii) These generalisations appear to be much more true of the new town centre and the avenues of Balakhiaban and Khiaban Pahlevi, than the old town centres and its avenues - Tabarsi and Pain Khiaban, the explanation of which requires a synthesis of the conclusions arrived at in chapter 16 and provides a comprehensive statement of location for industrial and commercial functions in the city.

In chapter 16 it was shown that location by function is possible only where the industry concerned is split into special functions in its organisation, and this varies from industry to industry dependent on the extent to which an industry is characterised by several factors. These were :-

(i) The degree to which processes of production and sale are separable.

(ii) The degree or mechanisation in the industry, partially dependent on (i).

(iii) The value of the product dealt in, in relation to its bulk.

Whilst these factors were shown to govern the possibility of specialisation in organisation, and therefore separation of functions, the influence making such specialisation and separation mandatory, was seen to be the price of land, whether acting directly, or through the medium of rents or sargofli. In areas of high land price, low order functions

were shown to move out, their places being occupied by functions of a higher order.

Now this implies that location by function will be more important in high land value areas than in low ones, and for industries which can specialise rather than for those which cannot. The old town centre, and its main avenues because of its ancient establishment, has remnants of a location pattern based not on functional specialisation but on product group - derived from a period when modern influences such as the possibility of more sophisticated divisions of labour, mechanisation, urban growth and rising land values, were not felt in the city, whilst vertical organisation and location by product were still important. Today, dueto the prevailing economic and social circumstances of the population dwelling in theold town, whose demands are unexacting and non-sophisticated, the opportunities for, and necessity to specialise and locate by function has not been so powerful. Consequently, fossil remnants of the older systems of economic organisation and location such as the bazars remain, and the generalisation of location by function is not so valid here.

In contrast, the new town centre and main avenues which have grown up largely in a cultural and technical environment in which themodern influences are dominant has not had the opportunity and the pressure for specialisation and location by function. Moreover the higher income, wider experience and high social class of the population of the new town, with its new and exacting demands amplifies the situation, so that the economy is more attuned to location by function, and to specialisation.

PART IV

18. - GENERAL CONCLUSION

Mashhad's pre-industrial past was largely based on one main function, that of religion, whilst the Harram, its raison d'etre, insured the city's survival despite repeated destruction. The old town was above all the product of functional diffuseness, with society based on kin or clan, and the economy organised vertically into product groups located in bazars. The end of the nineteenth century was however for Mashhad, as for many other Middle Eastern cities the end of the pre-industrial era, and the beginning of the era of development in which great changes in the morphology and the social and economic structure of the city are taking place in response to pressures of modernisation, urbanisation, and technical and cultural innovations stemming largely from the western (developed) world.

As the city grows, expanding from the old town within the city walls, to the new town of grid-iron layout in the west and south, society is becoming stratified into horizontal, class divisions, which to some extent have a spatial expression.

The old town and its suburbs have a population living at high (gross) densities which is characterised by an inbalanced sex ratio of the adult age group (more males than females) and by high rates of general fertility, whilst the new town has characteristics which are largely the reciprocal of these. Rates of literacy for males, females, and the total population are low in the old town and higher in the new town zones, and women of the new town are in general more emancipated than those of the old town. The occupations structure is not well stratified but zones of the old town seem to be

dominated by small entrepeneurs, labourers and domestics, and in the suburbs of the south, army personnel. The new town has more landowners, merchants, teachers and government employees, and merchants are common in the areas south of the bazars, in the old town. Old town zones have smaller households, and this is correlated with lower income and lower expenditure per capita, whilst the heads of these households tend to be illiterate, relatively young, and have low work status. All of this tends to be reversed in the new town zones, where households are in general much larger.

Mashhad's fast growth is partly due to in-migration. Most of those in-migrants living in households ('second stage' migration) are in the periphery of the city, in suburbs of the new town or old town, depending on their socio-economic status, and two-thirds of them are from other urban areas. However the majority of in-migrants (most of them males) are not established in households, but live as lodgers in the caravanserai and lodging houses of the old town centre, often separated from their families who remain in the villages. This 'first stage' in-migration thus fills the vacuum left in the city centre by the wealthier families who are leaving their houses and moving out to the suburbs of the west and south. Income tends to be maldistributed between the few 'rich' living in the new town and the many poor of the old town, though large minorities of wealthy families in the latter, and of poor families in the former attest to the fact that society is by no means fully stratified as yet. Expenditure patterns which are a product of the demand characteristics generated by these attributes differ between the two sections of the city.

In the old town low incomes limit the range and quality of the types of goods demanded, but in the new town higher averages incomes imply that utilities are lower for a given product, and better quality is demanded, as well as a greater range of more expensive goods which are not available to lower income families of the old town. These differing expenditure patterns have some control over the structure and location of tertiary land use elements in the city, which exist to satisfy consumer demands - this particularly in the two central areas of the city.

The economy of the city was, in its pre-industrial phase characterised by chronic smallness in size of unit, and by vertical organisation and functional diffuseness. The non-specialised enterprises were severely limited in size by the nature of the technical environment (little mechanisation and a scarcity of liquid capital), and this was given institutional form in the guild systems. Location was based on product group, not function, and the bazar and caravanserai were centres in which a variety of functions were carried out, related to one specific product group.

During the twentieth century, three main factors have become important in the economy, and in the economics of location in the city. These are the possibility of more intense specialisation due to the increasing division of labour in city society (a product of growth of population); the increasing importance of mechanisation, necessitating a growth in size of the optimum economic unit; and the pressure on land in the form of increased price and rents, due to the physical growth of the city.

The first two of these factors are increasing the possibility of functional specialisation within economic organisations in the city whilst the third is the force responsible for causing a relocation of the separated functions. Lower order functions (prpduction, residential and wholesaling land uses) move out away from higher priced land, and higher order functions (retailing, servicing)take their place. The phenomenon of sequent occupance is thus partially established whereby successively higher order functions appear in the centre of the city, displacing lower order functions outwards to the periphery.

These changes vary from industry to industry, and from location to location in the city however, dependent on certain qualifying factors. The extent to which an industry becomes specialised and is located by function depends on the degree to which the process within it are divisible into separate operations; on the optimum size of unit, mechanised or not; and on the value of the product dealt in, in relation to its bulk. There is a tendency for larger units to be forced to move into peripheral areas of lower land price before smaller ones, and all things being equal, a high value-low bulk product will be able to withstand increases in land price more effectively than a low value - high bulk product.

Since the price of land is a controlling factor,then location by function is more general in areas of higher land price than in those of low price, and for industries which can specialise rather than for those which cannot. The old town still has remnants of a location pattern based on

vertical organisation and product group (such as bazars) because pressures towards specialisation and location are not fully operative yet. This is at least partially due to the low order of demands created by the population of the old town, and also to a legacy of pre-industrial organisation inherited in the old city. The opportunity for, and pressure towards functional specialisation and location has been much greater in the new town due to its much later establishment and due also to the higher order demands of the population of the new town, a product of its social and demographic attributes discussed earlier. Consequently location by function and specialisation are much more fully developed in the new town than in the old, and this is reflected in the land use structure of the city.

The above discussion summarises the main ways in which the economy and population structure of an Islamic, pre-industrial city are responding to pressures resulting from changes in the technological and cultural environment. In effect the evidence presented is an outline of some aspects of the phenomenon of urban development both economic and social, and as far as possible considers the interaction between the two, in the belief that if we are to have a realistic view of development it must consider other than simply economic variables. The thesis begs many more questions than it can hope to answer, and has dealt with aspects of urban growth only at a general level and for one particular place.

However the developments taking place in Mashhad appear to be common to many cities of the Middle East today, and the conclusions derived from the analysis of development in Mashhad may be of more general applicability;

only further research on other cities can determine however the extent to which Mashhad is representative of other cities in the Middle East. Intuitive observations would tend to suggest that despite its continued importance as a centre of pilgrimage Mashhad is by no means unique in its response to modern development. A dominant pre-industrial function was common to many cities of the Middle East, and many of the present day cities are, like Mashhad divided into an old town and a new town, each with its central area.

Future geographical research on urban growth in the Middle East will best be directed at particular aspects of the phenomenon, and with the provision of more accurate, comprehsnive and detailed data might explain more fully the relationship between economic and social developments, and in particular the effect of the changing demand characteristics of the population on the commercial and economic structure of the urban fabric. It is believed that the best approach will be one in which detailed data of a quantitative nature are sought by survey methods and through field work in a particular urban environment (whether this be one city or a small number of cities). However this must be done with the aim of providing explanations in terms which will be of use and applicabil ity/to the Middle Eastern urban environment generally, and not merely to the particular city under study. Whilst we must as geographers clearly have a respect for the uniqueness of 'place', this must not be allowed to dominate our analysis. On the one hand comparative studies of large numbers of cities based on inadequate and summary statistics, ignoring place, will by themselves be of little value in advancing realistic explanations of the

phenomenon of urban development in the Middle East. On the other hand however the proliferation of detailed descriptions of separate cities which regard 'place' as wholly unique will serve us little, unless these descriptions are related in some way to other cities, or to phenomena which are common to other cities, from which useful generalisations might be drawn.

GLOSSARY (terms in order of appearance)

ostan	province
rud	river
kuh	mountain
hesar	thousand
masjid	mosque
lut	group of salt basis
kavir	salt desert
shia'	one of the two main sections of Islamic faith
Imam	a Shia' saint
qanat	irrigation tunnel
Khandag	ditch (against flood)
daym	unirrigated agricultural land
bagh	garden
harram	holy quarter of a city
Ostanegots	shrine administration
waqf	land endowed
mullah	priest, cleric
pain	lower
bala	upper
Khiaban (Kh.)	avenue
caravanserai	terminus, or staging post for caravans
kutche	alley
arg	fortress
meidan	square, place

makbara	graveyard
ferengi	foreigner
hara	district or quarter of a
mohalla	city
suq	market, bazar
taifa	trades corporation
asnaf	guild (Arabic)
senf	guild (Persian)
gedik	right to operate a business or trade
moharram	Shia' religious month of mourning
mussafakhaneh	lodging house, mainly for pilgrims (mussafah)
sharestan	administration unit based on a town (shahr=town)
dehistan	administrative unit based on a village (deh-village)
durushki	horse drawn taxi
sargofli	'key' money
seyh	head, principal
gelim	rug
giveh	canvas shoe
omdefurush	wholesaler
khordefurush	(part) retailer
mehmankhaneh	lodging house which serves meals
mast	yogurt
ordebehesht	3rd month of Persian year
Tir	5th month of Persian year.

SELECTED BIBLIOGRAPHY

This is restricted to works cited in the text, plus a few other works on urbanisation and urbanism in Iran, the Middle East, and in some other underdeveloped areas.

ABBREVIATIONS

A.A.A.G	Annals of the Association of American Geographers.
Am.Ec.Rev.	American Economic Revue.
Am.J.Ec. and Sociol.	American Journal of Economics & Sociology
Am.J.Sociol.	American Journal of Sociology
Ann. de Geog.	Annals de Geographie
(Br) J.Sociol. (British)	Journal of Sociology
Bul.de l'Ass.de Geog.Fr.	Bulletin de l'Association de Geographie Francais
Bul.de la Soc.Royale B.de Geog.	Bulletin de la Societe Royale Belge de Geographie
Cah. Int. Sociol.	Cahiers Internationales de Sociologie.
Demog.	Demography
Ec.Bull.Asia and Far East.	Economic Bulletin for Asia and the Far East.
Ec.Dev. and Cult. Change	Economic Development and Cultural Change.
I.B.G.	Institute of British Geographers
Ge.	Geography
GJ.	Geographical Journal
G.R.	Geographical Revue
I.G.U.	International Geographical Union
J.Am. Inst. Plan.	Journal of the American Institute of Planners.
J.of Geog.	Journal of Geography
J.Royal Stats. Soc.	Journal of the Royal Statistical Society

J. Pol.Econ.	Journal of Political Economy
Land Econs.	Land Economics
M.E.Aff.	Middle East Affairs
M.E.Comm.	Middle East Commerce
M.E.J.	Middle East Journal
P. and P.Reg.Sc.Ass.	Papers and Proceedings of the Regional Science Association.
Rev. de Geog.Alp.	Revue de Geographie Alpine
R. Inst. Int. Aff.	Royal Institute of International Affairs.
Rev. de la Med.	Revue de la Mediterrannee
Tijd var Ec. en Soc.Geog.	Tijdschrift voor Economische en Sociale Geographie.

Ab-el-Aty
'Suez - Urban and port study'
M.Sc. Univ. London (external)

Abu-Lughod, Janet
'Urbanisation in Egypt: Present state and future prospects'
Ec. Dev. and Cult. Change. XIII, 3, p.313, April. 1965.

Adib-Soltani, Sharif
'An analysis of expenditure elasticities'
in CENTO Symposium on consumer expenditures

Admiralty, Naval Intelligence Division Handbook Series
'Persia' 1945.

Alam, Manzoor
'Ibn Khaldun's Theory of cities...'
Islamic Culture, April 1960; 1-17;

Al-Khalaf, Jassim
'Growth of Baghdad during the last fifty years; Census and effects'
Paper 2737, I.G.U. Conf. London, 1965 in 'Abstract of Papers', Hamilton, I, (ed.) London 1965

Alonso, William
'The form of cities in developing countries'
Proc. and Papers. Reg.Sc.Ass. 13, 1964

Alonso, William
'A theory of the Urban land market'
Papers and Proc. Reg. Sc. Ass. vol.6. 1965

Avery, P.
'Modern Iran'
London 1965.

Awah, H.	Morocco's expanding towns G.J.; 1964 March.
Bailey, N.T.J.	'Statistical methods in Biology' London, 1959
Bank Markazi, Iran.	Urban Income and Expenditure Survey, Preliminary Tables in the Bulletin,July 1962 to July 1965. Tehran.
Bassett, J.	'Persia the land of the Imams' London 1878
Berry, Brian, J.L.	Some Relations of Urbanisation and Basic patterns of Economic Development in: Forrest R. Pitts (ed.), op.cit.
Berry, B.J.L; Simmons, J.W; Tennant, R.J.	'Urban Population densities: Structure and Change' G.R. 1963 pp. 389-405
Berger, Morroe, (ed).	'The New Metropolis in the Arab World' New Delhi, 1961
Bobek, Hans	'Tehran' 'Geographische Forschungen' Festschrift zum 60 Geburtstag von Hans Kinzl Schlern-Schriften Band 190 Innsbruck, 1958
Bogue, Donald J : and Zachariah, K.C.	'Urbanisation and migration in India' In Turner R. (ed.) 'India's Urban Future' Berkeley, 1962
Bonifatyeva, L.I.	'Problems of urbanisation in Asiatic countries. India as an example' Paper 2803 I.G.U. Conf.London, 1965. in 'Abstract of Papers' Hamilton, I, (ed.) London, 1965
Boucheman, A.	'Une petite cite caravaniére - Sultané' Doc. et Etudes Orientales Tome IV 1937
Brownlee, K.A.	'Industrial Experimentation' H.M.S.O. 1949 (reprint) 1951.
Brush, J.E.	'The morphology of India's cities' In Turner R. (ed.) 'India's Urban Future' Berkeley, 1962.

Bulugma, M.	Bengazi - Urban Geography Ph.D. dissertation Dept. of Geog. Univ. of Durham, 1964.
Castro, E. Ray	'Tel Aviv: New City of Palestine' J. of Geog. Chicago XXXVI 1937
Census of Iran,	in 2 summary vols. and a series of statistical bulletins for each Census District. General Dept. of Public Statistics, Tehran.
CENTO	Symposium on consumer expenditures Istanbul 1963
Central Asian Research Centre	'Cities of Central Asia' London 1961
Chardin, J.	'Voyages du Chevalier Chardin en Perse et autres lieux de l'orient' ed. L. Langles, Paris, 1811. 8 vols.
Chelhold, Joseph	'Introduction à la sociologie de l'islam' Islam d'Hier et de l' anjourdhui' Vol.XII Paris, Editions Besson, 1958
Chisholm, M.	'Rural settlement and land use' London 1962
Clark C.	'Population pressure in Kingston, Jamaica: A study of unemployment and overcrowding' I.B.G. Ann. Conf. Bristol.1965 (Mimeo)
Clark, Colin	'Urban Population Densities' J.Royal Stats. Soc.Ser.A.Vol.114.1951 pp. 490-6.
Clarke, John I.	'The Iranian city of Shiraz' Dept. of Geography. Univ. of Durham, 1963
Clavijo	'Embassy to Tamburlane (1403-1406) trans. Le Strange, G. London, 1928
Connolly, A.	'Overland journey to India' 2 vols. London 1830
Curzon, Lord	'Persia and the Persian Question' 2 vols. London 1892.

Danger, Rene	'L'urbanisme en Syrie - La ville de Damas' Urbanisme, Paris, No.55. May 1937
Davis, K.	'The origin and growth of urbanism in the world' Am. J. Sociol. L.X; 5; 1955.
Davis, K. and Golden H.	'Urbanisation and the development of pre-industrial areas' Ec. Dev. and Cult. Change III, 1,Oct.1954.
Dean, Edwin R.	'Social determinants of price in several African markets' Ec. Dev. & Cult. Change. XI Jan.1963
Doxiadis and Associates	'The Future of Kerbala' Athens 1958
Duncan, O.D, Cuzzort R.P. and Duncan B.	'Statistical Geography; Prob-lems in analysing areal data' Glencoe, Illinois 1961
Eastwick, E.B.	'A diplomats three years residence in Persia' London 1864.
Elwell-Sutton,L.P.	'A guide to Iranian Area Study' American Council of Learned Societies, New York, 1952
Encyclopaedia of Islam	Leyden, 1954
Farrag, Abdelmeguid	'Demographic trends in the Arab world' In Berger, Morroe, op.cit. p.1.
Ferrier, J.P.	'Caravan Journeys' trans. Jesse, W., ed. Seymour H.D. London 1845
Field, H.H.	'Bibliography on southwestern Asia' vols. 1 - 8. Miami U.P. Florida, 1955
Fischel, W.J.	'The City in Islam' M.E.Aff. 7 No.67 June 1956 pp.227-232.
Fisher, S.N. (ed.)	'Social forces in the Middle East' Ithaca, Cornell U.P. 1955
Fryer, D.W.	'The million city in south-east Asia' G.R. Oct.195
Funaioli, Ugo	'Impressioni agrario sulla regioni di MESHED. Rivista di agricoltura subtropicale et tropicale. Anno 55. No.10-13 Oct.-Dec.1961.p382-409. (English Summary)

Gardet, Louis	'La cité musulmane; vie sociale et politique' Etude's Musulmanes, I. Paris 1961
Gibb, H.A.R. and Bowen H.	'Islamic Society and the west' Royal Inst. of Int. Aff. London, 1950
Ginsburg, Norton, S.	'Atlas of economic development' Chicago, 1961
" " "	'The great city in south-east Asia' in Hauser, P.M (ed.) 'World Urbanism' Am.J.Sociol; LX;5;1955.
Goldsmid, Sir F.J.	Eastern Persia .... boundary commision' London 1872
Granqvist, Hilma	'The arab family' in U.N.World Pop.Conf.1954; vol. V1. 'Urbanisation and family size' Rome 1954
Greer, Scott	Theemerging city New York, 1962
Gregory, S.	'Statistical Methods and the geographer' London,1963
von Grünebaum, G.E.	Islam: Essays in the Nature and growth of a Cultural Tradition' Memoir 81. American Anthrop. Ass. April 1955. p.141-158
Gulick, John	'Images of an Arab City' J.Am.Inst.of Plan.Aug.1963
Hacker, Jane M.	'Modern Amman' Dept. of Geog.Univ.ofDurham.1960
Hamdan, G.	'The growth and functional structure of Khartoum' G.R. vol.L.1960 pp.21-40.
" "	The pattern of medaeval urbanism in the Arab world Ge. v.47 Pt.2.No.215 April 1962
" "	'Sizes of African capitals' Bull. de la Soc.de géog. d'Egypte' Tome XXVI 1963
Hanson, M.H. Hurwitz, W.N., and Madow W.G.	Sample Survey methods and theory 2 vols. New York, 1953
Hauser, Philip (ed.)	Urbanisation in Asia and the Far East. Calcutta 1957
" "	'World Urbanism' Special issue of Am.Jnl.Sociol.1955
Homayoon, Bahman	'Changes in urban family expenditures and their relation to increases in national income' In CENTO. Symposium on consumer expenditures
Higgins, Benjamin	'Economic Development. problems, principles and policies.' London 1959

Hirt, Howard, F.	'The Oriental Bazar' I.G.U. Conference, London, 1965. Mimeo
Hookham, Hilda	'Tamburlaine the conqueror' London, 1962
Hoselitz, Bert. F.	'Cities of India, and their prob-lems.' A.A.A.G. June 1959
" "	'The city, the factory and economic growth' An. Ec. Rev. Vol.XIV.2. May 1955
" "	'Generative and Parasitic Cities' Ec. Dev. and Cult. Change 3;3; pp.278-94; April, 1955.
" "	'The role of cities in the economic growth of underdeveloped countries' J.Pol.Econ. v.61;3; pp.195-208; June, 1953
" " (ed.)	'The progress of underdeveloped countries' Chicago 1952
" "	'Social structure and economic growth' Economia Internazionale, Vol.6;3;Aug, 1953.
" "	'Sociological Aspects of Economic Growth' Glencoe, Illinois, 1960
" "	'Urbanization and economic growth in Asia' Ec.Dev. and Cult. Change Vol.VI;1;Oct.1957,p.44.
Hoyt, Homer	The Residential and Retail Patterns of Leading Latin American Cities. Land Econs. Nov.1963. Vol.XXXIX No.4.
Institute of Economic and Social Research, Djakarta	'The urbanisation of Djakarta' J.Ekonomi dan Kenangan Indonesia Vol.VIII;p.696 -763
Institute d'études et de Reserches Sociales, Univ.Tehran by P.Vielle	'Tehran. Les prix, le marche des terraines et la societe urbaine' Tehran 1961 (Mimeo) 'Ahwaz: Ecologie et Socio-Economie' Tehran 1963 (Mimeo)
International Labour Office	(i) 'Why labour leaves the land...Studies and Reports; New Series, 59. Geneva, 1960. (ii) 'Yearbook of Labour Statistics, 1962' Geneva 1962
Jefferson, Mark	'The law of the Primate City' G.R.Vol.29 No.2. April 1939

Kedourie, Elie — Islam and the Orientalists : Some Recent Discussions Br.J.Sociol.Vol.7.1956.

Kemp, N. — 'Abadan' London, 1954

Ibn. Khaldun — The Muguddimah ed. and trans. by Franz Rosenthal. New York. 1958

Khanuikov, N.V. — 'Meched, la ville sainte et son terretoire..... Extraits d'un voyage dans le Khorasan' La Tour du Monde, 1861 2e Semestre, pp.269-288

Kolodny, Y. — 'Aspects et structures du peuplement urbaine en Israel'. Méditerrané ; 2; 1963.

Kolb, W.L. — 'The Social Structure and functions of Cities' Ec. Devlp. and Cult.Change Vol.III.1.Oct.'54.

Kuhn , A. — 'Bargaining Power in Transactions: Basic Model of Interpersonal Relationships' Am.J. of Ec. and Soc.Vol.23;1;p.49,Jan.1964.

Kureshy, N. — 'Urban Development in West Pakistan' Ph.D. Thesis (unpublished) London School of Economics 1958.

Kuznets, Simon E. — 'Quantitative aspects of the economic growth of nations' Ec. Devlp. and Cult. Change in eight parts V.1.Oct. 1956 to X.2.Jan.1962.

Lambton, A.K.S. — 'Islamic Society in Persia.' School of Oriental and African Studies, London, 1954.

Lambton, A.K.S. — 'Landlord and peasant in Persia.' Royal Inst. of Int. Aff. New York, 1953.

Lampard, Eric, E. — 'The history of cities in the economically advanced areas' Ec.Dev. and Cult. Change.III;2;Jan.1955.

Lee, S.Rev. — 'Travels of Ibn Battuta.' 1828

Levy, R. — 'The Social structure of Islam.' Cambridge 1957.

Lerner, Daniel — 'The passing of traditional Society: modernizing the Middle East'. Glencoe, Illinois, 1958.

Le Strange, G. — 'Lands of the Eastern Caliphate' London, Cambridge 1905.

Lockhart, L. — 'Nadir Shah' London, 1938

" " — 'Persian Cities' London 1960.

Longrigg, S.H. — 'The Middle East: a social geography' Chicago 1963.

Marcais, G. — 'La conception des villes dans l'Islam' Rev.de la Med. No.10.1945.

Malcolm, Napier — 'Five years in a Persian Town' (Yazd) London, 1905.

Marcais, Georges — 'L'urbanism Musulmane'Congres de la Fed. des.Socs. Savantes de l'Afriques Nord. Algiers. 1940.

Marsh, Capt. H.C. 1872 — 'Ride thro' Islam' London 1877

Marthelot, P. — 'Baghdad. Notes de géographie urbaine' Ann.de Geog. Jan-Fev. 1965 LXXIV.

" " — 'L'expansion recente de la ville de Beyrouth' Bull. de l'Ass. de geog. Francais;313;March 1963.

" " — 'Une ville remplit son site - Beyrouth' Mediterannee; 4;3;1963.

Maxwell, A.E. — Analysing qualitative data. London. 1961.

McGregor, Sir C.M. — 'Narrative of a journey through the province of Khorassan ....' 2 vols. London 1879.

McLoughlin Peter F.M. — 'The Sudan's three towns: A demographic and Economic Profile of an African Urban Complex' Ec.Dev. and Cult.Change.1964 (3 parts).

Mehta, Surrinder,K. — 'Some demographic and economic correlates of primate cities: a case for revaluation' Demog.;Vol 1;1;1964; pp 136-147.

Miner, Horace — 'The primitive city of Timbuctoo' Princeton, 1953.

Minorsky, V. — (i)'Meshed' (ii) 'Tus' in Encyc.of Islam. 1932.

Monicault, J.de. — 'La part de Beyrouth et l'économie des pays de Levant' Paris: Libraries de techniques et economie 19[illegible]

Moroney, M.J.	'Facts from figures' Penguin, London, reprint 1965.
Mugubumje, Akin.L.,	'Urbanization in Nigeria : A constraint on economic development' Ec.Dev. and Cult.Change.XII;4;Pt.1; p.413; July 1965.
Murphy, Rhoads	(i) 'Shanghai; key to Modern China' London 1953. (ii) 'New capitals of Asia' Ec. Dev. and Cult. Change Vol.5;3; April 1957.
Muth, R.F.	'The spacial structure of the housing market' Papers and Proc. Reg.Sc.Ass.vol.7.,1962.
Nachate, Chehade	'Aleppo' in Berger, Morroe, op.cit.pp 77-102.
Naraghi, Ehsam	'Les classes moyennes en Iran' Cah.Int. de Sociol. T.XXII Paris.1957.
" "	'Les methodes d'etudes de la population dans les pays à statistiques incompletes ou depourvus de statistiques, notammant en Iran' Paris 1956.
O'Donovan, E.	'The Merv Oasis' 2. vols. London 1882.
Orgels, Bernard.	'Une petite ville méditerranée du Syrie - Tartous' Bull.de la Soc. Royale Belge de Geog: Fasc.1-2;1960.
Oriental Institute, University, Chicago	'City invincible - symposium on urbanism in the ancient near east' Chicago U.P. 1960.
Panty, E.	'Villes spontanées et villes creés en Islam' Ann. de l'Inst. d'études Orientales;IX;1951 Univ. d'Algier.
Parsons, Talcott	'The Social System' Glencoe, Illinois 1951.
Pirenne, Henri	'Mediaeval Cities' Princeton, U.S.A. 1925.
Pitts, Forrest R. (ed.)	'Urban systems and economic development'. Conference on urban systems research in underdeveloped and advanced economies. Oregon, 1962.
de Planhol X.	'The World of Islam' Ithaca, Cornell U.P.1959.
Pope A.U. (ed.)	'A survey of Persian Art' 2 vols. London. 1958.
" " and Bauduin E.E.	'City Plans' In Pope A.U. (ed.) op.cit.vol.II.p.1391.

Presidence du Conseil — 'L'Industrialisation des pays du Moyen Orient' (Notes documentaires et Etudes) Paris, 1949.

Raimov, T. — 'The formation of a big city - Tashkent' Paper 1900. I.G.U. Conf. London 1965. in Abstract of Papers' Hamilton, I, (ed.) London 1965.

Reddaway, W.B. — Economics of Underdeveloped Countries. Adv. Sc. XIX 1962-63.

Redfield R and Singer M. — 'The Cultural Role of cities' Ec.Devlp. and Cult. Change. Vol.3. No.1. Oct.1954.

Riachi, G. — 'Beirut' in Berger, Morroe, (ed.) op.cit. pp 103-115.

Rostow, W.W. — 'The stages of economic growth' Cambridge 1960.

Santos, M. — 'Quelques problemes des grande villes dans les pays sous - developées' Rev. de Geog. de Lyon XXXVI;3;p 202; 1961.

Schorlau,K. — Moderne Umgestaltungen in Grundriss Iranischer Stadte. Erkunde.15.1961.

Schore, Lee F — Urbanisation and Economic Development; The demographic contribution. Am.J.Econ.and Sociol. V.23.No.1. Jan.1964.

Sendut, Hamzah — 'The major implications of urbanisation in Malaya' Paper 1304, I.G.U. Conf.London, 1965 in Abstract of Papers' Hamilton, I. (ed.) London, 1965.

Shiber, S.G. — (i) The Urban Arab Scene' M.E.Comm. Dec.1961. (ii) 'Comprehensive City-Planning and Housing in Kuwait' M.E.Comm. Jan.1962.

Singh U. — 'Allahabad: a study in urban geography' Ph.D. Thesis, London School of Economics, 1957-8.

Sjoberg, Gideon S. — 'The pre-industrial city, past and present' Glencoe, Illinois, 1960.

Smith, Adam — 'The wealth of nations' 1776. pub.Dent, London,1957.

Sofer, Rh. — 'Family problems in a society of early industrialisation' World Population Conf.1954. U.N.Document E(CONF/13/378.

Soulais, Jean	'Villes de la Turquie Contemporaine' Ann. de Geog. March, 1940.
Sovani, N.V.	'The analysis of 'over-urbanisation' Ec.Dev. and Cult.Change. Vol.12,2.Jan.1964.
" "	Poona: a resurvey. Poona, 1956.
Spate, O.H.K.	'Rangoon: a study in urban geography' G.R.June 1942.
Stratil-Sauer, G.K.N.	'Meschshed' Leipzig, 1937.
" "	'Birdjand, ene ostpersiche stadt' Miteilungen der Geographischen, Gessellshaft, Vien.Bd.92, Heft. 4-6 1950.
Sykes, Sir P.	'The glory of the Shia' world' London 1910.
Thoumin, R.	'Damas: Notes sur la repartition de la population: origine et par religion'. Rev.de geog.Alpine, Grenoble;XXV;1937.
Tinker, Hugh	'The City in the Asian Polity' School of Oriental and African Studies, London, 1964.
Tourneau, Robert	'Fès avant le protectorat' Casablanca, 1949.
Tower, J.Allen	'Oasis of Damascus' Pub.American Univ., Beirut; Soc.Sc.Series;12;1935.
Troin, J.F.	'Les souks du pays Zaer; zones d'extension des Marchés' Paper 1437.I.G.U. Conference,London,1965 in 'Abstract of Papers' Hamilton,I.(ed.) London 1965.
Turner,R.(ed.)	'India's urban future' Berkeley California U.P.1962.
Turvey,R.	'The Economics of real property' London 1957.
U.N.	Demographic Yearbook,1962. Geneva.1963.
"	'Processes and problems of industrialisation and urbanisation in underdeveloped countries' New York,1955.
" Economic Commission for Asia and the Far East	'Aspects of Urbanisation in ECAFE countries' Ec.Bull.for Asia and Far East.Bangkok 1953.

U.N. Economic Commission for Asia and Far East, Division of Social Affairs — Case studies of arrangements for evaluation and utilisation of population census results. Report V. Iran New York1960. U.N.Publications ST/SOA/SER/R/5/E/CN.I/CONF. 2/L.23

U.N. World Population Conference 1954 — 'Urbanisation and family size' Vol.Vi.Rome 1954.

UNESCO — 'The Social implications of Industrialisation and Urbanisation in Africa south of the Saha ra - Calcutta 1956.

United States Operations Mission ...to Iran U.S.O.M. — reports and plans - Isfahan, Shiraz,Samandaj.

Verhaenger, P. — 'L'urbanisation de l'Afrique noire' Brussels, 1962.

Wahba, Raphail — 'Cairo' in Berger, Morroe op.cit.p.23.

Weber, Max — 'The City' Trans. and ed. Martindale, E. and Neu-with, G., Glencoe,Free Press.1958.

Weuleresse,J. — 'Antioche: Essai de géographie urbaine' Bull.d' etudes Orientales; IV;1934.Algiers.

White, Bryan — 'Kabul'. Geog.Mag.,Vol.35;12;April 1963.

Yate, Lt-Col. — 'Kurasan and Sistan' London 1900.

Yates, F. — 'Sampling Methods for censuses and surveys' London 2nd.edition, 1953.

Zada, Seyed,Abbas,Shah,Mansour. — 'Mansoori guide to Khorasan, Meshed and the Holy Shrine of Hazrat Imam Reza the eighth apostle of Hazrat Mohammad, the prophet'. Mashhad,1926.

Zinkin, M. — 'Asia and the west' London 1951.

1. A Smith 'The Wealth of Nations' Vol.1.p.15,1776,Everyman's Library 412 London reprint 1957.

2. Chapter 15.

3. B.F. Hozelitz 'Urbanisation and economic growth in Asia' Ec.Dev. and Cult. Change Vol.6.No.1.1957 p.48.

4. Data provided by manager in discussion with author

5. Chapter 15.

6. O'Donovan 'The Merv Oasis' vol.1. p. 1882 (quoted in this work,chap.4).

7. J.I.Clarke, 'The Iranian City of Shiraz,p.27, Research Paper Series No. 7. Department of Geography, Univ. of Durham 1963.

8. Chapter 15.

9. The system of shares varies a great deal in different parts of the country. It is discissed in great detail in Lambton A.K.S. 'Landlord and peasant in Persia' New York, 1953.

10 Scharlan,K. 'Moderne Umgestaltungen im Grundriss Iranischer Stadte' Erdekunde 15, 1961, p.187.

11 The table is not a true measurement of the relationship between functions and the population total, since as seen,the existence of the pilgrim trade probably calls forth more establishments of some functions than would otherwise be the case.

12 Private communication to author from Head of Shrine Administration.

Appendix A. Statistical Tables

Notes to Appendix A.

1. Generally - explanations of statistical methods are in Appendix C.

2. Tables 6 - 10

The classification is based on the mean percentile of 29, i.e. 3.45% which has been modified -
A = values greater than 3.20%
B = values between 1.10% and 3.20%
C = values less than 1.10%

3. Tables 11,15, 16 and 17

The significance classification is

S = significant
MS = marginally significant
N = non-significant
N^1 = non-significant, but included in the general evaluation for other reasons.

4. Tables 18 - 21

(i) (a) = number of strata
(b) = percentage of frontal units
and all figures except values for (a) are percentages.

(ii) $\$$ = sigma, or the standard deviation from the arithmetic mean

(iii) r = correlation coefficient. In this case Spearman's Rank Correlation Coefficient was used, but only for the calculation of confidence limits.

(iv) $Sa = \$\sqrt{1-r^2}$, or the standard error of the estimate (a).

(v) 2Sa = twice the standard error, the probability of values falling within this limit (+/- the mean) is 95%. It is thus a confidence limit at the 95% level of probability.

5. In all cases $\$$ = sigma, or standard deviation from the arithmetic mean.

Appendix A. Table 1

MASHHAD, POPULATION DENSITY BY RESIDENTIAL ZONE, 1963

Zone	Area[1] in acres	Population[2]	Density[3]
1	116.5	10,890	94.2
2	96.5	13,171	136.5
3	-	25,530	-
4	110.5	6,249	56.6
5	72.8	9,025	124.5
6	124.0	6,387	51.5
7	72.5	15,433	212.9
8	50.5	9,244	183.5
9	116.5	19,063	163.6
10	17.0	3,293	281.5
11	39.0	8,491	215.9
12	65.0	10,590	163.0
13	39.5	6,209	157.2
14	60.5	9,403	155.4
15	101.0	5,971	59.1
16	45.0	9,422	209.4
17	132.5	19,539	147.5
18	63.5	7,796	124.7
19	29.5	7,289	246.8
20	107.0	4,701	43.9
21	89.5	16,028	179.1
22	37.5	8,629	230.1
23	92.5	14,402	155.6
24	46.0	7,399	160.8
25	102.5	22,138	215.9
26	60.5	4,066	67.2
27	38.5	5,098	132.4
28	66.5	9,442	141.9
29	59.5	6,288	105.7
		301, 105 MEAN	139.1

1. Gross Residential
2. Multiplied up from sampling fraction
3. Persons per acre

Figs. exclude population in prison, hospitals and other large institutions. (approx. 11,000).

For map of zones, see overlay 1 at the back of the thesis.

Appendix A. Table 2

Mashhad. Sex ratio of the population over 10 years old, and results of Chi-squared tests, for 29 zones.

Zone	Value of Chi-squared (n = 2)	Probability Value	Ratio
SIGNIFICANT			
22	6.9	< .01	1.158
26	7.2	< .01	1.299
27	3.9	< .05	1.095
4	3.9	< .05	1.268
MARGINALLY SIGNIFICANT			
9	1.2	< .20	.872
10	1.9	< .20	.746
11	1.5	< .30	.849
NON-SIGNIFICANT			
1	0.1	all>.30	.995
2	0.3		.955
3	0.2		.979
5	0.9		.892
6	0.6		.892
7	0.1		.992
8	0.1		.975
12	0.1		.965
13	0.4		.911
14	0.1		.969
15	0.6		1.099
16	0.04		1.007
17	0.5		.938
18	0.2		1.035
19	0.2		1.042
20	0.04		.967
21	0.2		1.054
23	0.2		.992
24	0.04		1.020
25	0.2		1.008
28	0.02		.968
29	0.3		.986
Total for City (n = 29)	31.94	>.30	.989 (NULL)

Source - 5% Sample Survey of Households, 1963

Appendix A. Table 3

Mashhad. Sex Ratio of the Population aged 15-34. and results of chi-squared test, for 17 zones

Code	Zones	Chi-squared Value (n=2)	Probability Value	Ratio
SIGNIFICANT				
I	6 + 1	3.9	< .05	1.444
J	11+24	3.7	< .10	1.500
M	19+16	10.7	< .01	1.675
P	12+21	3.4	< .10	.934
Q	27+12	3.6	< .10	.907
MARGINALLY SIGNIFICANT				
H	5 +10	2.1	< .20	.966
L	22+28+15	1.1	< .20	1.290
O	14+18	0.9	< .30	1.035
D	9	0.9	< .30	1.040
NON-SIGNIFICANT				
A	2	0.04	all > .30	1.151
B	3	0.3		1.218
C	7	0.04		1.144
E	17	0.2		1.114
F	23	0.2		1.099
G	25	0.4		1.079
K	20+26+4	0.2		1.207
N	29+18	0.1		1.159
Total for City (n=17)		31.78	.10-.20	1.157 (NULL)

Appendix A. Table 4

Mashhad. General Fertility Ratio (children under 10 years to women aged 15-44)and result of chi-squared tests, for 17 zones.

Code	Zone	Chi-squared Value (n = 2)	Probability Value	Ratio
SIGNIFICANT				
A	2	12.2	< .001	1.664
B	3	4.7	< .05	1.797
C	7	21.1	< .001	2.051
E	17	24.2	< .001	1.984
I	6+1	28.8	< .001	.894
J	11+24	6.0	< .02	1.719
K	20+26+4	56.4	< .001	.685
P	13+21	14.2	< .001	1.630
Q	27+12	10.7	< .01	1.184
MARGINALLY SIGNIFICANT				
G	25	2.7	< .20	1.745
N	29+18	1.3	< .30	1.091
NON-SIGNIFICANT				
D	9	0.8	all >.30	1.772
F	23	0.4		1.448
H	5+10	0.9		1.478
L	22+28+15	0.7		1.466
M	19+16	0.3		1.642
O	14+8	0.4		1.552
TOTAL for City (n=17)		185.8	< .001	(NULL) 1.513

APPENDIX A. Table 5

Mashhad. Dependency Ratio (population 0 - 14 and over 65, to population 15-65), and results of chi-squared tests for 29 zones.

Zone	Chi-squared Value (n=2)	Probability Value	Ratio
SIGNIFICANT			
1	6.5	0.5-0.2	112.0
4	28.1	∠.001	53.7
7	28.8	∠.001	104.6
10	10.1	.01-.001	151.5
12	10.1	.01-.001	73.4
29	10.1	.01-.001	82.3
17	20.2	∠.001	123.6
20	7.5	002-.05	65.7
24	6.4	.02-.05	113.1
26	8.1	.01-.02	40.4
MARGINALLY SIGNIFICANT			
18	5.3	.05-.10	83.6
13	3.1	.20-.30	80.9
25	2.7	.20-.30	100.7
27	4.1	.10-.20	73.6
NON-SIGNIFICANT			
2	0.3	all >.30	94.2
3	0.5		90.1
5	0.9		91.2
6	0.1		89.4
8	0.5		88.7
11	1.1		94.4
21	1.1		87.9
14	0.5		86.6
16	1.9		98.7
19	0.1		90.5
22	0.2		94.2
23	0.9		90.1
28	0.5		86.7
15	0.1		88.1
City (n = 29)	161.0		91.5 (NULL)
9	1.2		91.8

Appendix A. Table 6

Proportion of the population (over 10 years) literate, and chi-squared test, for the 29 zones, Mashhad.

Zone	% Literate	Component of the chi-squared value	Component expressed as % of total	Classification
1	59.5	11.8	2.3	B
2	57.8	9.7	1.9	B
3	32.7	38.3	7.6	A
4	76.8	53.8	10.6	A
5	42.0	23.9	4.7	A
6	63.6	12.0	2.4	B
7	26.7	44.1	8.7	A
8	38.4	5.8	1.2	B
9	34.6	22.9	4.5	A
10	35.5	5.4	1.1	C
11	23.7	34.3	6.8	A
12	55.0	4.5	0.9	C
13	61.7	9.1	1.8	B
14	32.9	14.3	2.8	B
15	67.0	18.6	3.7	A
16	46.2	-	0.0	C
17	43.0	2.8	0.6	C
18	46.1	-	0.0	C
19	55.5	0.4	0.0	C
20	80.7	41.9	8.3	A
21	55.3	0.9	1.8	B
22	39.7	2.7	0.5	C
23	49.3	4.1	0.8	C
24	20.6	35.0	6.9	A
25	41.1	5.6	1.1	B
26	78.5	43.7	8.6	A
27	64.3	13.2	2.6	B
28	65.0	20.6	4.1	A
29	65.1	19.4	3.8	A
CITY	52.8	506.9 (at n=29)	99.9	$< .001\%$p.

Appendix A. Table 7

Proportion of males (over 10) literate, and chi-squared test for the 29 zones. Mashhad.

Zone	% Literate	Component of the chi-squared value	Component expressed as % of total	Classification
1	74.3	5.6	2.7	A
2	72.8	5.4	2.6	B
3	40.7	27.9	13.8	A
4	87.5	13.2	6.5	A
5	55.8	1.9	1.0	B
6	84.8	10.7	5.3	A
7	43.8	12.6	6.3	A
8	56.2	0.3	0.0	C
9	45.5	12.1	5.7	A
10	55.6	0.2	0.0	C
11	35.6	15.4	7.7	A
12	67.8	1.6	0.8	C
13	79.6	7.5	3.7	A
14	41.8	9.6	4.7	A
15	82.2	7.9	3.9	A
16	58.3	0.2	0.0	C
17	57.0	0.7	0.3	C
18	62.5	0.1	0.0	C
19	70.8	2.0	1.0	C
20	86.9	10.3	5.1	A
21	68.1	2.6	1.3	B
22	57.1	3.1	1.5	B
23	67.9	2.2	1.1	C
24	31.0	17.3	8.6	A
25	58.4	0.4	0.1	C
26	93.5	13.3	6.6	A
27	80.0	3.4	1.7	B
28	80.1	9.8	4.8	A
29	77.9	6.6	3.2	B
CITY	60.7	203.9 (at n=29)	100.0	<.001%p.

Appendix A. Table 8

Proportion of females (over 10) literate and chi-squared test, for the 29 zones, Mashhad.

Zone	% Literate	Component of the chi-squared value	Component expressed as % of total	Classification
1	44.5	6.6	1.8	B
2	42.1	4.5	0.8	C
3	24.6	10.8	3.0	B
4	68.3	50.0	13.9	A
5	30.0	0.5	0.0	C
6	42.0	1.8	0.5	C
7	8.1	40.5	11.4	A
8	20.3	16.9	4.8	A
9	22.1	11.3	3.2	B
10	8.5	12.3	3.4	B
11	9.7	21.4	6.0	A
12	41.7	3.5	1.0	C
13	42.0	2.1	0.6	C
14	23.8	4.7	1.3	B
15	53.1	11.6	3.3	A
16	36.8	0.0	0.0	C
17	28.0	3.0	0.8	C
18	30.2	0.5	0.0	C
19	40.8	1.9	0.5	C
20	74.1	43.2	12.1	A
21	43.5	7.9	2.2	B
22	24.7	3.8	1.1	B
23	31.1	2.0	0.6	C
24	10.3	18.7	5.3	A
25	23.2	10.2	2.9	B
26	67.0	32.0	8.9	A
27	53.0	12.6	3.5	A
28	49.7	11.6	3.3	A
29	53.6	13.3	3.7	A
CITY	33.6	359.2	99.9	$<.001\%p$

Appendix A. Table 9

Proportion of females 'active' (all children at school, plus all women working outside the home), and chi-squared tests for the 29 zones, Mashhad.

Zone	% Active	Component of the chi-squared value	Component expressed as % of total	Classification
1	30.3	13.3	6.1	A
2	25.4	3.9	1.8	B
3	20.4	0.0	0.0	C
4	41.5	38.0	17.5	A
5	20.4	0.0	0.0	C
6	25.7	2.1	1.0	C
7	12.3	11.8	5.4	A
8	9.6	13.3	6.1	A
9	14.2	8.0	3.8	A
10	6.7	6.7	3.1	B
11	4.0	25.6	11.4	A
12	24.8	4.8	2.2	B
13	26.6	3.1	1.4	B
14	19.3	0.1	(0.04)	C
15	27.2	3.3	1.5	B
16	13.8	5.2	2.4	B
17	14.6	7.8	3.6	A
18	21.5	0.1	(0.05)	C
19	25.9	2.6	1.2	B
20	35.8	15.0	6.9	A
21	22.0	4.7	2.6	B
22	22.4	0.3	0.2	C
23	17.2	1.4	0.6	C
24	7.8	14.3	6.7	A
25	17.0	2.9	1.3	B
26	28.7	3.4	1.5	B
27	36.2	15.8	7.3	A
28	25.1	2.9	1.3	B
29	29.3	6.6	3.0	A
CITY	20.4	218.0	99.9	$\angle$.001%p

Appendix A. Table 10

Proportion of the population 'recently'* in-migrant, and chi-squared test, for the 29 zones, Mashhad.

Zone	Per cent 'recently' in-migrant	Component of chi-squared value	% contribution to chi-squared values	1 Class
1	25.1	18.2	1.5	B
2	29.5	54.6	4.6	A
3	41.2	406.6	34.0	A
4	11.7	5.0	0.4	C
5	7.5	26.2	2.2	B
6	12.7	4.2	0.3	C
7	3.5	99.6	8.3	A
8	12.0	13.0	1.1	B
9	14.0	6.6	0.6	C
10	4.2	16.8	1.4	B
11	2.2	4.7	0.4	C
12	2.3	13.1	1.1	B
13	4.5	52.0	4.3	A
14	2.1	64.2	5.4	A
15	30.2	27.8	2.3	B
16	28.0	30.6	2.6	B
17	20.2	4.1	0.3	C
18	21.4	3.4	0.3	C
19	21.3	2.9	0.2	C
20	22.4	3.2	0.3	C
21	0.6	126.7	10.6	A
22	19.8	1.3	0.1	C
23	8.8	31.4	2.6	B
24	38.1	89.2	7.5	A
25	18.2	54.7	4.6	A
26	Sampling Error too great			
27	19.1	0.4	0.0	C
28	14.9	18.4	1.5	B
29	27.4	17.9	1.5	B
CITY	17.5	1196.8	100.0	.001 P.

* 'recently' = ten years or less

1 See notes to Appendix A.

Appendix A. Table 11

Distribution by origin (rural/urban) of the recently in-migrant population, and chi-squared tests, for the 29 zones, Mashhad.

Zone	% Urban in origin	% Rural in origin	Chi-squared value at 1^{o} Freedom	Probability of validity of null hypothesis	Significance
1	95.7	4.3	59.2	<.001	S
2	91.8	7.7	66.1	<.001	S
3	22.6	76.0	309.0	<.001	S
4	5.4	78.4	40.4	<.001	S
5	32.4	50.0	7.6	.001-.01	S
6	80.5	19.5	4.5	.02-.05	MS
7	19.4	74.2	23.9	<.001	S
8	100.0	0.0	31.2	<.001	S
9	40.7	57.8	32.6	<.001	S
10	----------Sampling Error too great ----------				
11	44.1	54.8	12.5	<.001	S
12	75.2	24.0	6.5	.01-.02	S
13	50.0	42.9	0.4	>.98	N
14	90.0	10.0	2.8	.10-.20	MS
15	60.4	30.8	0.4	>.98	N
16	92.5	6.8	48.2	<.001	S
17	85.4	13.6	41.3	<.001	S
18	63.1	34.3	0.0	>.99	N
19	32.5	67.5	36.3	<.001	S
20	73.6	5.7	22.1	<.001	S
21	----------Sampling Error too great ----------				
22	52.3	29.5	2.3	>.20	N
23	85.9	6.3	20.0	<.001	S
24	58.5	40.1	2.8	.05-.10	MS
25	68.5	30.4	2.9	.05-.10	MS
26	----------Sampling Error too great----------				
27	87.7	4.1	17.7	<.001	S
28	67.6	31.0	3.9	.02-.05	MS
29	92.0	6.9	30.5	<.001	S
CITY	63.1	34.3	825.1 (at 25^{o} of freedom)	<.001	S

Appendix A. Table 12

ANALYSIS OF VARIANCE

A. STRUCTURE OF EXPENDITURE - ITEMS OF GENERAL CONSUMPTION

SOURCE of V.	SUM OF SQUARES	DEGREES F.	MEAN SQUARE	COMPONENTS OF V.
Between Rows	642,977,546	9	71,441,949	$n^2 (\$_1^2 + \$_0^2)$
Between Cols.	196,811,280	11	17,891,935	$n^1 (\$_2^2 + \$_0^2)$
Residual	177,485,696	99	1,792,785	$\$_0^2$
TOTAL	1,017,174,522	119		

VALUE OF VARIANCE		%
Between Rows V.	5,804,097	63.0
Between Cols.V.	1,609,915	17.5
Residual V.	1,792,785	19.5
TOTAL V.	9,206,797	100.0

'F.' TEST

Between Rows V. Ratio 39.86) = $n^1=9$) $n^2=99$) $<.001$ %P

Between Cols.V Ratio =9.98) = $n^1=11$) $n^2=99$) $<.001$ %P

B. STRUCTURE OF EXPENDITURE ON FOOD ITEMS

SOURCE OF V.	SUM OF SQUARES	DEGREES F.	MEAN SQUARE	COMPONENTS OF V
Between Rows	9,571	14	683.6	$n^2 (\$_1^2 + \$_0^2)$
Between Cols.	3,726	11	338.7	$n^1 (\$_2^2 + \$_0^2)$
Residual	1,728	154	11.2	$\$_0^2$
TOTAL	15,025	179		

VALUE OF VARIANCE		%
Between Rows V.	56.0	62.9
Between Cols.V.	21.8	24.5
Residual V.	11.2	12.6
TOTAL V.	89.0	100.0

'F.' TEST

Between Rows V. Ratio = 61.04 / $n^1 = 14$ $n^2 = 154$ = $<.001$%P

Between Cols.V. Ratio = 30.24 $n^1 = 14$ $n^2 = 154$ = $<.001$%P

Appendix A. Table 13A

Regression equations. For expenditure groups 1-12, mean per capita expenditure per annum on items of general consumption. (rials)

ITEM	Correlation	Mean	Standard Deviation	Expression	when b=10,000
1. Food	+.99	8549	3967	a=.3060b+3235	a=6835
2. Tobacco	+.05	338	84	a=.0033b+223	a=256
3. Rent, owner costs	+.93	1893	2866	a=.2080b-1122	a=958
4. Running costs, furniture etc.	+.99	1878	1457	a=.1127b-79	a=1048
5. Clothing (female)	+.99	685	464	a=.053b-242	a=292
6. Clothing (males)	+.99	901	562	a=.0435b+146	a=581
7. Services	+.93	1218	776	a=.0564b+239	a=803
8. Recreation and education	+.93	431	485	a=.0375b-225	a=150
9. Travel	+.79	562	863	a=.0532b-361	a=171
10. Contributions, other expenses	+.93	954	1497	a=.1090b-765	a=874

Appendix A. Table 13B

Regression equations. For income groups 1-12, mean per capita expenditure per week on items of food consumption. (rials)

ITEM	Correlation	Mean	Standard Deviation	Expression	when b = 100
1. Food and drink consumed outside the home	+.97	10.4	6.7	a = .0354b+1.22	a = 4.76
2. Dairy products	+.96	11.9	7.3	a = .0382b+2.00	a = 5.82
3. Bread & flour	+.34	26.9	3.3	a = .0061b+25.38	a = 25.98
4. Rice	+.96	22.5	6.6	a = .0900b-1.9	a = 7.10
5. Mutton & Lamb	+.98	15.0	8.1	a = .0432b+4.8	a = 9.12
6. Poultry	+.98	1.9	3.2	a = .00003b+3.04	a = 3.04
7. Beef,pork, fish	+.21	3.1	.02	a = .0171b-2.53	a = -.82
8. Fats and Oils	+.94	13.2	8.0	a = .0403b+2.80	a = 6.83
9. Sugar and sweets	+.92	12.6	2.3	a = .0015b+9.62	a = 10.77
10. Fresh fruit & vegetables	+.96	22.4	14.9	a = .0780b+2.18	a = 9.98
11. Canned & dried fruit and nuts	+.85	1.9	1.5	a = .0068b+.14	a = .82
12. Pulses & cereals	+.99	4.9	1.5	a = .0080b+2.84	a = 3.64
13. Tea,coffee, cocoa	+.94	8.3	1.9	a = .0096b+5.81	a = 6.77
14. Other beverages	+.99	3.0	4.3	a = .0229b-2.94	a = -.65
15. Spices and other foods	+.90	2.9	2.8	a = .0135b-.60	a=+.75
TOTAL	+.98	149.2	70.0	a = .368b+53.78	a = 90.60

Appendix A. Table 14

REGRESSIONS EXPRESSED as PERCENTAGE DEVIATIONS from their RESPECTIVE MEANS, and estimated ELASTICITY COEFFICIENTS* (FIG. 31).

A. General Structure of Consumption Expenditures (rials)

ITEM	when B = 10,000 (100%)	Elasticity
1. Food	a = 80.0%	.55
2. Tobacco	a = 75.7%	.41
3. Rent and owner costs	a = 50.6%	1.30
4. Running costs and furniture	a = 55.8%	.80
5. Clothing (females)	a = 42.6%	.82
6. Clothing (males)	a = 64.5%	.83
7. Services	a = 65.9%	.80
8. Recreation and education	a = 34.8%	1.30
9. Travel	a = 30.4%	1.17
10. Contributions and other expanses	a = 91.6%	1.18

B. Structure of Food Expenditures (rials)

ITEM	when B = 100 (100%)	Elasticity
1. Food and drinks consumed outside the home	a = 45.8%	.77
2. Dairy products	a = 48.9%	.60
3. Bread and flour	a = 96.4%	.27
4. Rice	a = 61.7%	.51
5. Mutton and lamb	a = 60.8%	.61
6. Poultry	a = -42.1%	1.54
7. Beef, pork, fish	a = 99.7%	.11
8. Fats and oils	a = 51.7%	.67
9. Sugar and sweets	a = 85.4%	.35
10. Fresh fruit and vegetable	a = 44.6%	.65
11. Canned and dried fruit, and nuts	a = 48.4%	.75
12 Pulses and cereals	a = 74.3%	.49
13 Tea, coffee, cocoa	a = 81.6%	.40
14 Other beverages	a = -21.7%	1.56
15 Spices, other foods	a = 25.9%	.50

* Estimates from Bank Markazi, op.cit. 1959-60.

Appendix A. Table 15

Chi-squared tests for the distribution of functions along BALAKHIABAN.

FUNCTION	CHI^2 VALUE	P. VALUE	SIG.
A. All floors - total (n = 28)			
1.	98.1	<.001	S
2.	52.5	.01-.001	S
3.	66.9	<.001	S
4.	53.0	.01-.001	S
5.	118.0	<.001	S
TOTAL	388.5 (n = 140)	<.001	S
B. All floors - eastern section (n=15)			
1.	49.8	<.001	S
2.	29.4	.01-.02	S
3.	27.5	.05-.10	MS
4.	25.7	.05-.10	MS
5.	97.2	<.001	S
TOTAL9	229.6 (n = 75)	<.001	S
C. All floors - western section (n=14)			
1.	48.3	<.001	S
2.	23.1	.05-.10	MS
3.	39.4	<.001	S
4.	27.3	.01-.02	S
5.	20.8	.10-.20	N^1
TOTAL	158.9 (n = 70)	<.001	S

FUNCTION	VALUE	P. VALUE	SIG.
D. Ground floor - total (n = 28)			
1.	92.9	<.001	S
2.	38.4	.10-.20	N^1
3.	57.6	.001-.01	S
4.	54.9	.001-.01	S
5.	36.8	.10-.20	N^1
TOTAL	280.6 (n = 140)	<.001	S
E. Ground floor -eastern section (n=14)			
1.	48.3	<.001	S
2.	23.1	.05-.10	MS
3.	39.4	<.001	S
4.	27.3	.01-.05	MS
5.	20.8	>.20	N
TOTAL	158.9 (n = 75)	<.001	S
F. Ground floor - western section (n=14)			
1.	44.6	<.001	S
2.	15.3	>.30	N
3.	18.2	.10-.20	N^1
4.	27.6	.01-.02	S
5.	16.0	>.30	N
TOTAL	121.7 (n = 70)	<.001	S

SIG. = significance. See notes at head of Appendix A.

Appendix A. Table 16

Chi-squared tests for the distribution of functions along KHIABAN PAHLEVI

FUNCTION	CHI^2 VALUE	P. VALUE	SIG.
A. All floors - total (n = 21)			
1.	-	-	-
2.	28.8	.10-.20	N^1
3.	26.4	.10-.20	N^1
4.	39.7	.01-.001	S
5.	111.6	.001	S
TOTAL	206.5 (n=84)	.001	S
B All floors - northern section (n=12)			
1.	-	-	-
2.	18.1	.05-.10	MS
3.	18.9	.05-.10	MS
4.	17.7	.001-.01	S
5.	46.7	.001	S
TOTAL	101.4 (n=48)	.001	S
C All Floors - southern section (n=9)			
1.	-	-	-
2.	10.7	.30	N
3.	7.5	.50	N
4.	21.9	.01-.001	S
5.	64.9	.001	S
TOTAL	105.0 (n=36)	.001	S
D. Ground floor - total (n = 21)			
1	-	-	-
2	40.8	.001-.01	S
3	47.8	.001	S
4	73.8	.001	S
5	146.7	.001	S
TOTAL	309.1 (n=84)	.001	S
E. Ground floor-southern section (n=12)			
1	-	-	-
2	18.0	.10-.20	N^1
3	41.3	.001	S
4	51.0	.001	S
5	82.7	.001	S
TOTAL	193.0 (n=48)	.001	S
F. Ground floor - southern section (n=9)			
1	-	-	-
2	22.8	.001-.01	S
3	6.5	.70	N
4	22.8	.001-.01	S
5	64.0	.001	S
TOTAL	116.1	.001	S

SIG = significance. See notes at head of Appendix A.

Appendix A. Table 17

Chi-squared tests for the distribution of functions along

PAIN KHIABAN			and	KHIABAN TABARSI			
Function	Chi^2 Value	P. Value	Sig.	Function	Chi^2 Value	P. Value	Sig.
A. All Floors (n = 13)				A. All floors (n = 14)			
1	38.7	.001	S	1	28.9	.01-.02	MS
2	20.1	.01-.05	MS	2	58.1	.001	S
3	31.4	.001-.01	S	3	7.6	.90	N
4	15.3	.10-.20	N[1]	4	39.3	.001	S
5	17.9	.10-.20	N	5	59.6	.001	S
Total	123.4 (n=65)	.001	S	Total	193.5 (n=70)	.001	S
B Ground floor (n = 13)				B Ground floor (n = 13)			
1	65.5	.001	S	1	5.8	.95	N
2	15.9	.10-.20	N[1]	2	45.1	.001	S
3	18.5	.05-.10	MS	3	7.7	.90	N
4	24.1	.02-.05	MS	4	20.0	.05-.10	MS
5	17.9	.10-.20	N[1]	5	38.5	.001	S
Total	141.9(n=65)	.001	S	Total	117.1 (n=65)	.001	S

SIG = Significance., See notes at head of Appendix A.

Appendix A. Table 18

Regression equations for the distribution of functions along Balakhiaban

f	Equation	Values	β	r	Sa	2Sa
BALAKHIABAN - ALL FLOORS, EASTERN SECTION						
1.	b= 10.4 +.979a	$\bar{a}$ = 8; $\bar{b}$ = 10.4 a =15; b = 17.2	7.44	+.604	5.88	11.76
2.	b = 17.4 +.273a	$\bar{a}$ = 8; $\bar{b}$ = 17.4 a =15; b = 19.5	7.06	-.012	7.05	14.10
3.	b = 5.9 -.374a	$\bar{a}$ = 8; $\bar{b}$ = 5.9 a =15; b = 3.4	5.83	-.472	5.14	10.28
4.	b = 18.4 +.217a	$\bar{a}$ = 8; $\bar{b}$ =18.5 a =15; b =19.9	13.1	+.008	13.06	26.12
BALAKHIABAN - ALL FLOORS, WESTERN SECTION						
1.	b = 26.3 +2.600a	$\bar{a}$ =7.5; $\bar{b}$ =26.3 a =14.0; b= 43.2	13.78	+.679	10.11	20.22
2.	b = 11.5 +.323a	$\bar{a}$= 7.5 ; $\bar{b}$ =13.6 a=14.0 ; b =11.5	4.89	+.298	4.67	9.34
3.	b = 2.5 -.046a	$\bar{a}$=7.5 ; $\bar{b}$= 2.5 a=14.0 ; b= 2.2				
4.	b = 18.5 -.369a	$\bar{a}$= 7.5 ; $\bar{b}$= 18.5 a=14.0 ; b= 16.0	15.61	-.176	15.36	30.72

f	Equation	Value	β	r	Sa	2Sa
BALAKHIABAN - GROUND FLOOR, EASTERN SECTION						
1	b = 13.8+ 1.157a	$\bar{a}$ = 8 ; $\bar{b}$ =13.8 a =15 ; b =21.9	13.85	+.666	10.30	20.60
2	b = 24.4 +.085a	$\bar{a}$ = 8 ; $\bar{b}$ =24.4 a =15 ; b =25.0	21.97	+.195	21.52	43.04
3	b = 10.8 -.657a	$\bar{a}$ = 8 ; $\bar{b}$ =10.8 a =15 ; b = 6.2	12.41	-.655	9.38	18.76
4	b = 25.6 -.943a	$\bar{a}$ = 8 ; $\bar{b}$ =25.6 a =15 ; b =19.0	12.63	-.557	10.45	20.90
BALAKHIABAN - GROUND FLOOR, WESTERN SECTION						
1	b = 29.7 +1.421a	$\bar{a}$=7.5 ; $\bar{b}$ =29.7 a= 14 ; b =39.0	16.91	+.658	12.73	25.46
3	b = 3.9-.338a	$\bar{a}$=7.5 ; $\bar{b}$ = 3.9 a=14.0; b = 1.2				
4	b = 20.7-1.446a	$\bar{a}$=7.5 ; $\bar{b}$ =20.7 a=14.0; b =11.3	4.70	-.622	3.68	7.36

Appendix A. Table 19

Regressions equations for distribution of functions along Khiaban Pahlevi

f.	Equation	Values	ϕ	r	Sa	2Sa
KHIABAN PAHLEVI - ALL FLOORS NORTHERN SECTION						
2.	b = 13.6+ .231a	$\bar{a}$=6.5 ; $\bar{b}$ = 13.6 a=12.0; b = 14.9	7.01	-.021	7.04	14.08
3.	b = 6.8 - .245a	$\bar{a}$=6.5 ; $\bar{b}$ = 6.8 a=12.0; b = 5.5	4.60	-.042	4.55	9.10
4.	b = 9.4 + .745a	$\bar{a}$=6.5 ; $\bar{b}$ = 9.4 a=12.0; b =13.5	8.04	+.178	7.94	15.88
5.	b = 54.9 + 2.288a	$\bar{a}$ = 7 ; $\bar{b}$ =54.9 a = 13; b =68.6	30.41	+.028	30.34	60.68
KHIABAN PAHLEVI - ALL FLOORS, SOUTHERN SECTION						
2.	b = 12.8 -.013a	$\bar{a}$ = 5 ; $\bar{b}$ = 12.8 a = 9 ; b = 12.7	9.27	-.083	9.24	18.48
4.	b = 12.8 - 1.268a	$\bar{a}$ = 5 ; $\bar{b}$ = 12.8 a = 9 ; b = 7.7	8.63	-.553	7.19	14.38
5.	b = 37.7 - 7.467a	$\bar{a}$ =5.5; $\bar{b}$ = 37.7 a = 10; b = 4.1	21.86	-.636	16.87	33.74

f.	Equation	Values	ϕ	r	Sa	2Sa
KHIABAN PAHLEVI - GROUND FLOOR, NORTHERN SECTION						
2	b =20.0 + .239a	$\bar{a}$ = 6.5 ; $\bar{b}$ = 20.0 a =12.0 ; b = 21.3	9.77	+.063	9.75	19.50
3	b =12.1 - .115a	$\bar{a}$ = 6.5 ; $\bar{b}$ = 12.1 a =12.0 ; b = 11.5	7.84	-.055	7.58	15.16
4	b = 18.9 +1.344a	$\bar{a}$ = 6.5 ; $\bar{b}$ = 18.9 a =12.0 ; b = 26.3	14.96	+.790	9.17	18.34
5	b = 45.8 + 2.852a	$\bar{a}$ = 7 ; $\bar{b}$ = 45.8 a = 13 ; b = 62.9	28.04	+.302	26.72	53.44
KHIABAN PAHLEVI - GROUND FLOOR, SOUTHERN SECTION						
2	b = 14.3 -.367a	$\bar{a}$ = 5 ; $\bar{b}$ = 14.3 a = 9 ; b = 13.8	9.54	-.080	9.48	18.96
4	b = 13.6 -1.392a	$\bar{a}$ = 5 ; $\bar{b}$ = 13.6 a = 9 ; b = 8.0	8.61	-.233	8.37	16.74
5	b = 34.5 - 8.129a	$\bar{a}$=5.5 ; $\bar{b}$ =34.5 a =10.0 ; b =-2.0	27.4	-.636	21.12	42.24

Appendix A. Table 20

Regression equations for distribution of functions along Pain Khiaban

f.	Equation	Values	$	r	Sa	2Sa
PAIN KHIABAN - ALL FLOORS						
1.	b = 11.3 + 1.635a	$\bar{a}$ = 7 ; $\bar{b}$ = 11.3 a =13 ; b = 21.1	12.00	+.324	11.35	23.70
2.	b = 15.4 + .228a	$\bar{a}$ = 7 ; $\bar{b}$ = 15.4 b =13 ; b = 16.8	7.20	+.057	7.22	14.44
3.	b = 4.2 - .441a	$\bar{a}$ = 7 ; $\bar{b}$ = 4.2 a =13 ; b = 1.5	3.82	-.846	2.03	4.06
4.	b = 30.1 - 1.357a	$\bar{a}$ = 7 ; $\bar{b}$ =30.1 a =13 ; b =22.0	8.62	-.927	3.43	6.86
5.	b = 8.8 + .408a	$\bar{a}$ = 7 ; $\bar{b}$ = 8.8 a =13 ; b =11.3	4.68	+.390	4.26	8.52
PAIN KHIABAN - GROUND FLOOR						
1.	b = 12.7 + 2.648a	$\bar{a}$ = 7 ; $\bar{b}$ =12.7 a =13 ; b =28.6	15.34	+.621	12.01	24.02
2.	b = 23.7 + .801a	$\bar{a}$ = 7 ; $\bar{b}$ =23.7 a =13 ; b =28.5	8.98	+.066	8.51	17.02
3.	b = 6.2 - .205a	$\bar{a}$ = 7 ; $\bar{b}$ = 6.2 a =13 ; b = 5.0	5.46	-.214	5.32	10.64
4.	b = 46.5 - 3.332a	$\bar{a}$ = 7 ; $\bar{b}$ =46.5 a =13 ; b =20.9	4.10	-.670	3.07	6.14
5.	b = 8.9 + .216a	$\bar{a}$ = 7 ; $\bar{b}$ = 8.9 a =13 ; b = 9.8	6.67	+.684	4.86	9.72

Appendix A. Table 21

Regression equations for the distribution of functions along Kh. Tabarsi.

f.	Equation	Values	$	r	Sa	2Sa
	KHIABAN TABARSI - ALL FLOORS					
1.	b = 6.2 + .298a	$\bar{a}$ = 7.5 ; $\bar{b}$ = 6.2	3.86	+.516	3.30	6.60
		a =14.0 ; b = 8.1				
2.	b = 18.0 -.046a	$\bar{a}$ = 7.5 ; $\bar{b}$ =18.0	12.50	-.015	12.42	24.84
		a = 14.0; b = 17.7				
4	b = 18.2 = .499a	$\bar{a}$ = 7.5 ; $\bar{b}$ =18.2	10.85	+.211	10.55	21.10
		a =14.0 ; b =21.4				
5	b = 24.6 - 1.058a	$\bar{a}$ = 7.5 ; $\bar{b}$ =24.6	13.93	-.362	12.95	25.90
		a =14.0 ; b =17.7				
	KHIABAN TABARSI - GROUND FLOOR					
2	b = 23.3 - .462a	$\bar{a}$ = 7 ; $\bar{b}$ =23.3	16.00	-.082	15.93	31.86
		a = 13 ; b =20.6				
4	b = 26.6 + 1.385a	$\bar{a}$ = 7 ; $\bar{b}$ = 26.6	12.61	+.387	11.63	23.26
		a =13 ; b =34.9				
5	b = 17.6 - 1.397a	$\bar{a}$ = 7 ; $\bar{b}$ =17.6	12.96	-.157	12.63	25.26
		a =13 ; b = 9.2				

Appendix B. Notes on statistical methods

1. Sampling Error (Standard error of the sampling proportion)

Much of the second part of the thesis is devoted to the analysis of a 5% sample ofhouseholds in 29 zones of the city, and it is usually the case that this sample is divided up into two or more parts - such as males and females, or male literates, male non-literates, female literates, female non-literates. Since this is a sample, some method is necessary ofestimating the limits of the true population values from the sample values observed. The method used was to calculate the standard error of each part of the sample for each zone, by relating each part to the total in the zone, and assuming a binomial distribution. The expression is -

Standard Error of the Sampling Proportion, S.E. = $+/-\sqrt{\frac{p\%.q\%}{n}}$

where p is the frequency of the part to be tested (say male literates) and q the rest of the sample. This yields a range of variation (in percent) within which the true population frequency of male literates can be expected to lie, at the 95% level of probability.

This Standard Error obviously increases as the sampling total decreases, or as the total is split up more ways. For this reason it was necessary to in some cases combine the 29 zones into 17 larger zones, or to reduce the number of sampling portions by combining them into larger groups in terms of ratios previously defined.

No rigid limits were laid down as to the level of the Standard Error which is acceptable. This depends on the ratio between the S.E. and the sampling proportion itself, and thus varies from cases to case. Appropriate levels are therefore indicated in the text.

2. The Chi-squared test

This method tests whether the observed frequencies of a given phenomenon differ significantly from the frequencies that might be expected according to some assumed hypothesis.[1] In this thesis, the value Chi-squared was calculated in all cases by the standard expression - $\chi^2 = \sum \frac{(O-E)^2}{E}$ where, O= observed frequency, and E = expected frequency. The resultant value was then referred to the chi-squared distribution table of Fisher and Yates[2] to read off the probability of the validity of the null hypothesis at the number of degrees of freedom (n - 1) available. However the test was applied in two different ways distinguished in the text.

A. For one variable

In some cases it was important to know whether for the city as a whole the observed frequencies (in the 29 zones) of some phenomenon, say population literate, differed significantly from the null hypothesis that the observed distribution of this population was proportional only to the distribution of the total sample population of each zone. Or, put another way, a test was made of whether the 'observed' distribution was significantly different from the 'expected' distribution, where the 'expected' frequency for each zone is such that the ratio between literates and non-literates remains constant throughout the city. Such a test yields a chi-squared value for the city as a whole which is the total sum of the squares of the differences between 'O' and 'E' values, divided by the 'E' value, for each zone. The chi-squared value was then referred to

the distribution table[3] which yields the probability value of the null hypothesis being correct. Levels of acceptance are:-

< .01 P (1.0%) 'significant'

.01 P to .05 P (1.0-5.0%) 'marginally significant'

> .05 P. (> 5.0%) 'non-significant'

The individual zonal contributions, to the chi-squared total, that is for each zone $\frac{(O - E)^2}{E}$ were also found to be useful, however, since expressed as a percentage of the total, they indicate the contribution each zone makes to the total Chi-squared value. Zones were grouped into three classes on the basis of their contribution to the total:-

A. zones contributing 3.20% or more

B. zones contributing 1.10% - 3.20%

C. zones contributing 1.10%

Subsequently, maps drawn included only 'A' and 'B' types, 'C' types being excluded since their contributions was so low that it might easily have arisen by chance. The classes used were derived from the average contribution, 3.45% $\left(\frac{100}{29}\right)$. In practice the limit was lowered to 3.20% (especially where chi-squared totals were very high), and type 'B' zones were included as 'marginal' contributors.

B. <u>For more than one variable</u>

In some cases, analysis is of more than one variable, for instance in the analysis of the origin of in-migrants, where the in-migrant population from rural, and from urban areas is considered. In this case it is possible to apply the chi-squared test not only to the city as a whole, but to each zone separately by use of the 2 x 2 contingency table, and the additive property of chi-squared. The

null hypothesis is that for any zone the distribution by origin (Urban/Rural) of the in-migrant population, is proportional only to the total in-migrant population of the zone, and the ratio Urban/Rural remains constant through the city from zone to zone. Each zone was considered as a 2 x 2 table, in which the observed number of in-migrants of urban origin is related to the 'expected' number $\frac{(O - E)^2}{E}$ and this is added to the same calculation for those of rural origin, thus giving a chi-squared total $\sum \frac{(O-E)^2}{E}$ for each zone. This, [redacted] at the one degree of freedom available (n - 1) was for each zone, was referred to the table of the distribution of chi-squared, yielding the probability that the null hypothesis was correct. In this case, levels of acceptance were -

A. 'significant'

B. 'marginally significant'

C. 'non-significant'

The maps drawn then included only those zones which by the test, were either significant (A) or marginally significant (B) in which the observed frequencies are so close to the null hypothesis, that the differences (O - E) could easily have arisen by chance.

The additive property of chi-squared means that if all zonal totals are added, this yields a total chi-squared value for the city which can also be referred to the distribution tables, at 28 degrees of freedom (n-1). This showed whether or not the distribution as a whole was significantly deviant from the null hypothesis. Levels of acceptance in this case were those as for the city as a whole considered for one variable (above).

C. Yates Correction for small numbers.

In some cases the 'E' values were below 5, a critically low level at which the validity of the chi-squared test becomes doubtful.[4] In these cases the Yates Correction for small numbers was applied. This reduces the components of chi-squared, and therefore the total by:-

(a) subtracting 0.5 from the positive discrepancies of (O-E)

(b) adding 0.5 to the negative discrepancies of (O-E)

In fact it was necessary to apply this correction only in the analysis of the distribution of functions along main avenues (Chapter 17)

3. Correlation Methods

Two types of correlation co-efficient were used, and are distinguished in the text.

A. The Product Moment Correlation Coefficient (+)

This accurate but attenuated method was used infrequently, since it varies with individual frequencies the values of which may not be accurate. It is used for correlating the frequencies observed in one variable with those observed in another. The standard expression is:-

$$+ = \frac{1}{n} \sum \frac{(a-\bar{a})(b-\bar{b})}{\$a \cdot \$b}$$

However in practice a short method, particularly applicable to machine calculation, was used, the expression being

$$+ = \frac{\sum \frac{x \cdot y}{y} - \bar{x} \cdot \bar{y}}{\$x \cdot \$y}$$

where (x) and (y) are the real values (a) and (b) minus a convenient constant, in order to reduece the size of the numbers and make calculation easier, and $ = standard deviation. The result is of course, just the same as in the longer method. The possible value of (r) lie between +1.0 and -1.0, dependent on the extent to which changes in one variable are reflected in changes in the

other.

B. Spearman's Rank Correlation Coefficient. (R)

In most cases, this more easily calculated coefficient was used, and is indeed more applicable where statistics are of doubtful validity, since it considers only the rank, and not the actual values of the two variables. The values of (a) and (b) are placed in order of rank, and the two ranks are then compared, using the expression $R = \frac{1 - 6 \Sigma d^2}{n^3 - n}$ where (d) is the difference between the rank order of the individual (a) and (b) values. The limits of the coefficient are again +1.0 and -1.0, and spot tests showed that the difference between coefficients obtained by the Product Moment method, and the Spearman's Rank method were only of a low order.

C. Correlation Significance Test, or 't' test.

It is always the case that a correlation coefficient may not be significant because of the possibility of being affected by a chance occurrance, and this is especially the case where the number of pairs of variables is low. Consequently each correlation coefficient calculated was tested against the number of degrees of freedom available (the number of pairs of values minus two) in the table of 'Significance levels for correlation coefficients'[6]. Examples of the minimum correlation coefficient necessary to be significant are:-

when n = 100, a coefficient of +/-0.32 is significant at .001 P.(0.1%)

" n = 40, a coefficient of +/-0.49 is significant at .001P (0.1%)

" n = 10, a coefficient of +/-0.82 is significant at .001 P (0.1%)

(n = pairs of values)

4. Regression Lines and Confidence Limits

Two types of applications were used in the thesis.

A. Straight line Regression for Two Variables.

This was used only rarely as a method of summarising the points on a graph of the two variables, and indicating the trend, assuming that a straight line relationship holds between the two. This method provides a straight line such that the sum of the squares of the deviations (positive and negative) of the values observed about the line are at a minimum. It is the best estimate of a straight line trend, calculated from:- $a - \bar{a} = r \frac{\$a}{\$b}(b - \bar{b})$ and the correlation coefficient (r) used, was mainly the Spearman's Rank Coefficient, though the Product Moment Coefficient was sometimes used, as indicated in the text. Two pairs of values of (a) and (b) are necessary to draw a straight line, and one of these pairs is provided by the two mean values (a) and (b) whilst the other values of (a) is calculated from the formula above, given an arbitrary value of (b). In some cases it was also necessary to assess values of (b) given those of (a). This can be done by a reversal of the formula, as :- $b - \bar{b} = r \frac{\$b}{\$a}(a - \bar{a})$ followed by the same procedure.

2. Straight Line regression for one variable (or regular change)

This type of regression is the one more commonly used, where the variable (a) is regarded in its relationship to a constant increase of (b), along the (x) axis, with the assumption that the distribution is adequately summarised by a striaght line. This type of regression like the first type, produces a straight line by the 'least squares' method, insuring that the sum of the squares of the deviation or the values about

the line is at a minimum. The rate (y) at which (a) will change per unit increase of (b) is given by $y = \frac{\Sigma(a - \bar{a})\ (b - \bar{b})}{\Sigma(a - \bar{a})^2}$

However in practice a shorter method was used involving the estimation of averages for the two sets of values (a) and (b) and the calculation of the difference between each value of (a) and (b) and these assumed means. The differences are known respectively as (q) and (t). A correction is then applied to remove any influence resulting from the difference between the assumed and actual average values. The expression thus becomes:- $y = \frac{\Sigma q.t - \frac{\Sigma q.\Sigma t}{n}}{\Sigma q^2 - \frac{(\Sigma q)^2}{n}}$

and where the assumed mean happens to be the same as the real mean, then the correction factor is zero.

This yields a rate of change, (y) which can be negative or positive. From this, the two points through which the straight line is drawn are provided by the mean values (a) and (b) and by the value of (a) at a given value of (b), calculated from the rate of change, (y).

C. Confidence Limits

The regression line is only a best estimate of a trend, and in order to see the extent to which the regressions are an adequate summary of the values, confidence limits need to be calculated. In practice this only proved necessary in the analysis of the distribution of functions along main avenues (Chapter 17). The Confidence limit is based on the standard error of the regression estimate, and for a value (a) this is expressed as (Sa) and calculated by $S_a = \sigma_a \sqrt{1 - r^2}$ where r is the

correlation coefficient (Spearman's Rank, or Product Moment). It is known, assuming a normal distribution, that 'there is a 95% probability that actual values will differ from the regression line by not more than twice the standard error, and that the probability of values differing by more than this amount is only 5%'[7]. Confidence limits at the 95% level can therefore be drawn about the regression line by simply multiplying the standard error by two. The value (23a), then represents the limits negative and positive within which any value of (a) can vary at a given value of (b), at the 95% level of probability.

5. The Analysis of Variance

One of the simpler forms of this technique is used twice in the thesis, to analyse the general structure of expenditures, and the structure of expenditure on food, both in Chapter 12. The analysis of variance and its allocation into components due to rows and columns and a residual was used in an attempt to discern which component contributes most to the total variance, and in particular whether the variance between columns was sufficiently large enough to be significant, and to call for some explanation. In the two matrixes analysed, the rows are the amounts spent on each item at different levels of total income/expenditure, whilst each column represents the amount spent in different items at one particular level of income/expenditure. The residual accounts for all other variance, and in particular that within rows and within columns of the table.

The method used in that described in Brownlee[8] involving the calculation of :-

(1). $\Sigma(x^2)$ . . . . for the total where - x = individual values

(2). $\frac{\Sigma((\Sigma x)^2)}{n_1}$ . . . . for the rows n_1 = number of items in rows

(3). $\frac{\Sigma((\Sigma x)^2)}{n_2}$ . . . . for the columns n_2 = number of items in columns

(4). $\frac{(\Sigma x)^2}{N}$ . . . . for the total N = total number of items

Then:-

a. Between Rows sum of squares = (2) - (4)

b. Between Columns sum of squares = (3) - (4)

c. Residual sum of squares =(1) + (4) - (2) - (3)

d. Total sum of squares = (1) = (4)

In each case (a.b.c) the mean square is obtained by dividing the sum of squares by the number of degrees of freedom available, viz.

a. $(n_1 - 1)$

b. $(n_2 - 2)$

c. $(n_1 - 1) (n_2 - 1)$

6. <u>The Variance Ratio Test</u> (or Snedecor's 'F' Test)

To test the singificance of the components of variance, the variance ratio test is used. The between rows mean square is compared to the residual mean square at the respective number of degrees of freedom available and thisratio, referred to the Variance Ratio table[9] yields the probability that the between rows mean square is significant. The same procedure is followed in the case of the between columnsmean square. Depending on whether the rows and columns are significant, the actual variance value cam be calculated as follows :-

Notes and References

1. Gregory S. 'Statistical Methods and the Geographer' London, 1963. p.151. All methods used in this work, except the analysis of variance, are to be found in this text.

2. Fisher, R.A., and Yates, F. 'Statistical tables for biological, agricultural, and medical research'. Table IV

3. idem.

4. Maxwell, A.E. 'Analysing qualitative data' London 1961, p.21.

5. in Kendall, M.G. 'Rank Correlation Methods'

6. Fisher and Yates. op.cit. Table VI.

7. Gregory, S. op. cit. p.190

8. Brownlee, K.A. 'Industrial Experimentation', London, reprinted 1960, H.M.S.O., 4th edition. p.56.

9. Fisher and Yates, op.cit. Table V.

Other works consulted, which treat statistical methods as far as possible non-mathematically are -

1. Baily, M.T.J. 'Statistical methods in Biology' London 1959

2. Moroney, M.J. 'Facts from figures' Pelican reprint 1965

3. Snedecor, G.W. 'Statistical methods' Iowa, U.S.A. 1946.

4. Duncan, O.D. Cuzzort, R.P. and Duncan, B. 'Statistical geography: problems in analysing areal data' Glencoe, U.S.A.1961.

5. Yates, F. 'Sampling methods for censuses and surveys' Griffin. London 1953

6. Hansen M.M. Hurewitz W.M. and Madow, W.G. 'Sample Survey Methods and Theory' New York 1953 Vol.1.

Appendix C. Notes on Surveys

Mashhad is a large city, about which little was known at the time of the author's arrival in 1963. Statistics about economic and social phenomena can in these circumstances only be derived by census and sample survey methods. Public suspicion and a complex political situation, both of which are largely due to Mashhad's position as a centre of pilgrimage, meant that social and economic surveys by the author himself were difficult, and met with little public co-operation. Moreover financial support for the carrying out of surveys was not available. Thus whilst extensive field work and interviewing were possible in the bazars and commercial areas of the city, data on the population itself could not be collected by the author. Consequently much of the work carried out is based on surveys by various Iranian organisations, whose co-operation made it possible for the data collected to be adapted to the needs of this thesis. The use of surveys to derive conclusions for which they were not specifically designed is of course never satisfactory, but in the absence of any other possibility it must stand. Due to the high level of co-operation by the organisations responsible for the surveys, it was however possible to reduce the 'errors of adaptation' to a level which is thought to be acceptable.

1. <u>Sample Survey of Households, 1963</u>

This survey is part of a National Sample Survey taken by the General Department of Public Statistics (now part of the Plan Organisation) in 1963. For the purposes of the survey, the city of Mashhad was split up into 1753 blocks of approximately equal size and the total number of households and all other establishments in each one was noted - though many of the blocks

in areas of commercial and industrial land use, had no households. The blocks were combined into 24 areas (for ennumeration) one in twenty of the households was selected for interview, by a systematic method. Each ennumerator walked around the block on a route which would take him past the entrance to each household in the block, starting at the south east corner of it, choosing every twentieth household.

Each head of household was asked a range of questions intended to yield facts only, not attitudes, on the demographic structure of the household, the literacy status of its members, household amentities, and the last place of abode of the household. They survey is thought to be of fair accuracy since the ennumerators were experienced, having worked on previous samples, and on the census of 1956.

The survey was adapted to the needs of this work by a re-arrangement of the 24 areas into 29 zones which were thought to be homogeneous in terms of density of population, morphological history, and probable demographic structure. The boundaries were based on data from an earlier pilot survey of the city (see 2 below) and also from considerations of zonal sample size. Zones too large in size tend to 'average' out the fluctuations of attributes in the population, whilst zones too small in size of population mean that sampling errors become excessively large and no conclusions could then be drawn. The original blocks were not split up in the process of re-arranging but only combined in different zones, and so the sampling frame remained intact. The sampling fraction varied between zones from a minimum of 4.90% to a maximum of 5.12%. The total number of households interviewed was 2065 out

of a total of 40,963 representing a city sampling fraction of 5.0411%.

The data, stored on punched cards, were retabulated for the 29 zones and to the author's specific requirements on the I.B.M. 1403 machine at the General Department of Public Statistics. The author is indebted to Mr. Shahin, the Director of the Department who made this work possible, and to the staff of the department who gave up much valuable time to carry out the data processing.

2. Pilot Survey of Mashhad, March, 1963

This was the first survey oarried out in Mashhad during the course of the field work, and is neither random, not statistically valid, but was designed merely to provide information on the basis of which the city could be divided into zones, for further analysis, and in particular for the purpose of the 5% Household Survey. The pilot survey was carried out in conjunction with Mr. A. Saidi, and students of the Department of Geography and History, at the University of Mashhad.

The students each conducted 20-30 household interviews in each of the 40 blocks of the city chosen on thebasis of the students' prior knowledge of the inhabitants of the blocks (usually near the student's home), to ensure co-operation. Questions were asked on the physical size of the house occupied, and education, occupation, sex, age, of the members of the household. Only one aspect of the survey - that is the occupations structure, has been used in the work, since all other aspects were covered in the 5% Sample Survey at a later date. The pilot survey did however provide selective data on the basis of which the 29 zones were drawn up.

3. Survey of Expenditure and Income (Urban Iran) 1959-60.

This was a survey carried out by the research departmentof the Bank Markazi (itself part of the Iranian central bank, with the Bank Melli), as the basis for the calculation of a new cost of living index for Iran. Full results and statement of methodology have not yet been published, but preliminary results have appeared in many of the Banks Bulletins (Nos 2-13, July 1962 to July 1964), whilst the second part, a rural survey, has not yet been carried out. The sample was designed to represent Urban Iran as a whole, and the methods used are best described by the Research Department itself, quoted here from the Bank Markazi Bulletin No.2. July - Aug.1962, p.23).

'City Coverage All 10 cities with a population of 100,000 or more in the year 1334 were included in the survey. These cities are Abadan, Ahwaz, Esfahan, Hamadan, Kermanshah, Meshad, Rasht, Shiraz, Tabriz and Tehrah. In addition 22 smaller towns were selected (within Ostan with a probability proportional to population) to represent the balance of the population living in places of 5,000 to 100,000 population. The sample sizes in these smaller towns do not permit publication of individual city detail'.

'Population coverage - The survey was designed to represent all individuals and families living in towns of 5,000 population or more, except non-Iranian nationals and Iranian nationals living in military barracks, homes for the aged, jails, asylums, and similar institutions.

Selection of Sample Families - In Aban-Dey (Oct.1958 to Jan.1959) a sample of 2,000 identifiable sub-areas (blocks) located in the 32 cities were surveyed and every activity within these sub-areas was listed and identified. If the existing structure contained any living quarter, the living quarters were

identified as to tenure (whether renter-occupied, owner-occupied, or rent-free); also number of rooms in the living quarters were recorded. A single IBM punch card was prepared for each living quarter (dwelling place containing a single person living alone, or a group of persons maintained a separate family life). These IBM cards for each city were then stratified according to tenure, number of rooms in the dwelling, and geographic location within the city. From these cards so classified a sample of 3,200 dwelling places (plus 10 percent for expected losses) was selected for the Expenditure Survey.

Conduct of Survey: The sample of dwellings was divided into seven equal subsamples with each subsample surveyed in one of the seven months begginning with May 1959 and ending with November 1959. This procedure was followed in order to reflect the highly seasonal consumption pattern existing in Iran.

These dwellingplaces were visited by ennumerators who had undergone an intensive three week training course in the conduct of the survey. The family was interviewed by the resident Bank Melli enumerator in the family's dwelling. Information about the family and the family's expenditure and income were recorded on a questionnaire form containing detailed questions to be asked of each family. The average interview time was about 4 hours.

A total of 3237 questionnaires were completed out of a total of 3,600 dwelling assignments.

Survey results subject to error: The survey results are subject to sampling errors of varying magnitudes. In addition to the sampling errors, the survey results are subject to errors of response due to misunderstanding on the part of respondents and enumerators, to inability of respondents to correctly recall the amount of expenditure incurred or income earned, as well as deliberate

mis-statements to withold information because of misunderstanding the purpose of the survey. Every precaution was taken to minimise such errors of response by carefully training the enumerators on the techniques of interviewing and purposes of the survey, and by publicity through press and radio. The name of the respondent was never recorded on the questionnaire. Some items of inquiry are subject to greater errors than others. Money income is one of these items. On the basis of available evidence it is likely that money income in this survey may have been under-reported by as much as one-third of the true amount on the average'.

As indicated, the sample size was two small (about 0.3%) to allow the analysis of the structure of income and expenditure in individual cities, but data for Mashhad were made available to the author from which the maps of the distribution of family income per annum and family per-capita expenditure per annum, were drawn, based on the random sample of 182 families in the city Thanks are due to Dr. Abadian (Director of the Bank), Mr.Alavi and Mr. Shar-karimi for their close co-opration in this matter.

4. Ministry of Labour and Social Affairs, Urban Establishment Survey.

1342 (Jan 1963, in Persian)

This is a full census of all establishments in urban Iran, but excludes pavement traders. Its basis is a block survey of the cities, and results were published for Mashhad late in 1964. A total of 13,471 establishments was recorded in the city and in each case data were gathered on the date of the founding of the establishment, its product and functions, and much information on the workers employed, which was not used in this thesis. The classification used was a modified form of the U.N. standard classification

of economic activities, which is very comprehensive. This survey was drawn on to provide statistics of economic activity and was checked by data supplied by the Municipality at Mashhad which recorded a total of 11,950 licensed commercial and industrial premises in 1959 (excluding government offices and other public functions). Data was also provided by the city Health Department which carried out a survey in 1961, for sanitation purposes.

5. Survey of Establishments 1963

This survey of 10,000 establishments in the city, was carried out by the author in 1963 and 1964, with the aim of locating establishments of all types in the city, and classifying them by product and function. The propietor of each establishment was asked the nature of the product dealt in, and if more than one, which ones were considered to be more important; and also the exact nature of the function, or functions carried out in the establishment. This survey in combination with the Ministry of Labour survey provides the data on which part III of the thesis is based.

The product classification was as follows.

A. Foods

1. Fruit, vegetables, sabzi (greens)
2. Grocery goods (attar)
3. Sugar and tea, spices (Baghal)
4. Dried fruit nuts and seeds
5. Confiserie
6. Soft drinks, tea house
7. Eating establishments
8. Allof (wholesaler) of foodstuffs (i) cereals (ii) vegetable and fruit (iii) all other types

B. Fabrication of Metals and sales

9. Copperware, tinware, primus stoves, oil lamps

10. Steel welding

11. Hand productions of small tools (Blacksmith)

12. Samovars

13. Bicycles (repair)

14. Rubber goods from scrap tyres

15. Radio and electrical goods

16. Car repair and service

C. Other Fabrications and sales

17. Allof of timber

18. Carpenter

19. Sales of wood, charcoal

20. Footwear

21. Construction materials

22. Pharmaceuticals

23. Jewellery, watches, clocks

24. Other goods

D. Textiles and sales

25. Spinning yarn

26. Cloth

27. Clothes

28. Weaving cloth

29. Dying, wool, cotton etc.

30. Carpets

31. Allof of textiles or textile materials

32. Tailor, shirtmaker, dressmaker

33. Haberdashery

E.

34. Hotel, mussafakhmeh, mehmankhaneh

F. Offices and School

35. Bungha (government agency)

36. Bank

37. Public Administration

38. Commercial and other offices

39. School, other educational facilities

G. Services

40. Doctor, dentist, clinic, hospital

41. Public bath

42. Mosque

43. Laundry and dry cleaning

H. Transport

44. Bus terminus, taxi agency etc.

45. Freight agency

This product classification is of course a general one, since there exist in the city many combinations of these product groups in different units It is essentially a practical classification based on what was observed and not on what theoretically might exist.

The functional classification is fully explained in the text, but for convenience can be summarised here:

1. Producers, wholesalers, producer-wholesalers.
2. Producer-retailers
3. Specialist retailers
4. Non-specialist retailers
5. Service and other tertiary functions
6. Residential function
7. Changing function

This classification is of more importance than the product classification, and though generalised, is fully comprehensive. It is on the basis of this that the analysis of functions along the main avenues was carried out (Chapter 17)

6. Pilot Survey of Price, Ordibehesht - Tir 1343 (May-July, 1964)

In order to maintain a cost of living index, the Bank Markazi has a price recorder in several cities of Iran, including Mashhad, whose duty is to collect prices of various items on a continuous basis (shops are visited once per week). Because of the bargaining method of transaction, this type of collection is, of course extremely difficult to carry out, and in order to maintain some standards of comparability within Mashhad, all prices are collected by one man who is well known and well trusted by the shopkeepers. Bias is evident in that only co-operative shopkeepers will divulge estimations of their prices and so the survey is by no means a random one. However in this case it is thought that accuracy and comparability are more important than sound statistical representation, and since a choice must be made between the two,

the Bank chose the former alternative. The time period from which the statistics were drawn (three months) is a limited one, and so the figures must be regarded as illustrative examples only; they are not statistically representative of Mashhad as a whole, or even of the two town centres considered in the text (Chapter 17.)

Ph.D. Thesis, University of Durham, Department of Geography.
1965

'URBAN GROWTH IN RELATION TO SOCIO-ECONOMIC DEVELOPMENT AND WESTERNISATION : A CASE STUDY OF THE CITY OF MASHHAD, IRAN'

by D.F. Darwent

ABSTRACT

This thesis demonstrates and analyses some of the main ways in which the economic and social structure of a holy city of the Islamic pre-industrial world is responding to far-reaching changes in its technological and cultural environment, as several main economic and social developments such as industrialisation, rapid urbanisation and westernisation, are affecting it. The analysis is carried out as far as possible in a quantitative framework, employing some statistical methods. The thesis comprises four parts.

Following an introductory discussion on urbanisation in the Middle East in general, Part I provides some selected background data on the city and its surrounding area and discusses the main influences, especially that of religion which have affected it in the past, and which contribute to its present structure.

Part II discusses the geographical distribution of some demographic and social characteristics of the city, based on sample survey techniques. Two more or less separate parts of the city are identified. The 'Old Town' has a large population including most of the city's in-migrants living at high densities with low levels of education, traditional value systems and

low per capita income resulting in specific demand characteristics and patterns of expenditure. The new town in complete contrast has a small population, living at low densities, with higher levels of education, a 'westernised' system of values and a larger per capita income resultant in entirely different demand characteristics and expenditure patterns.

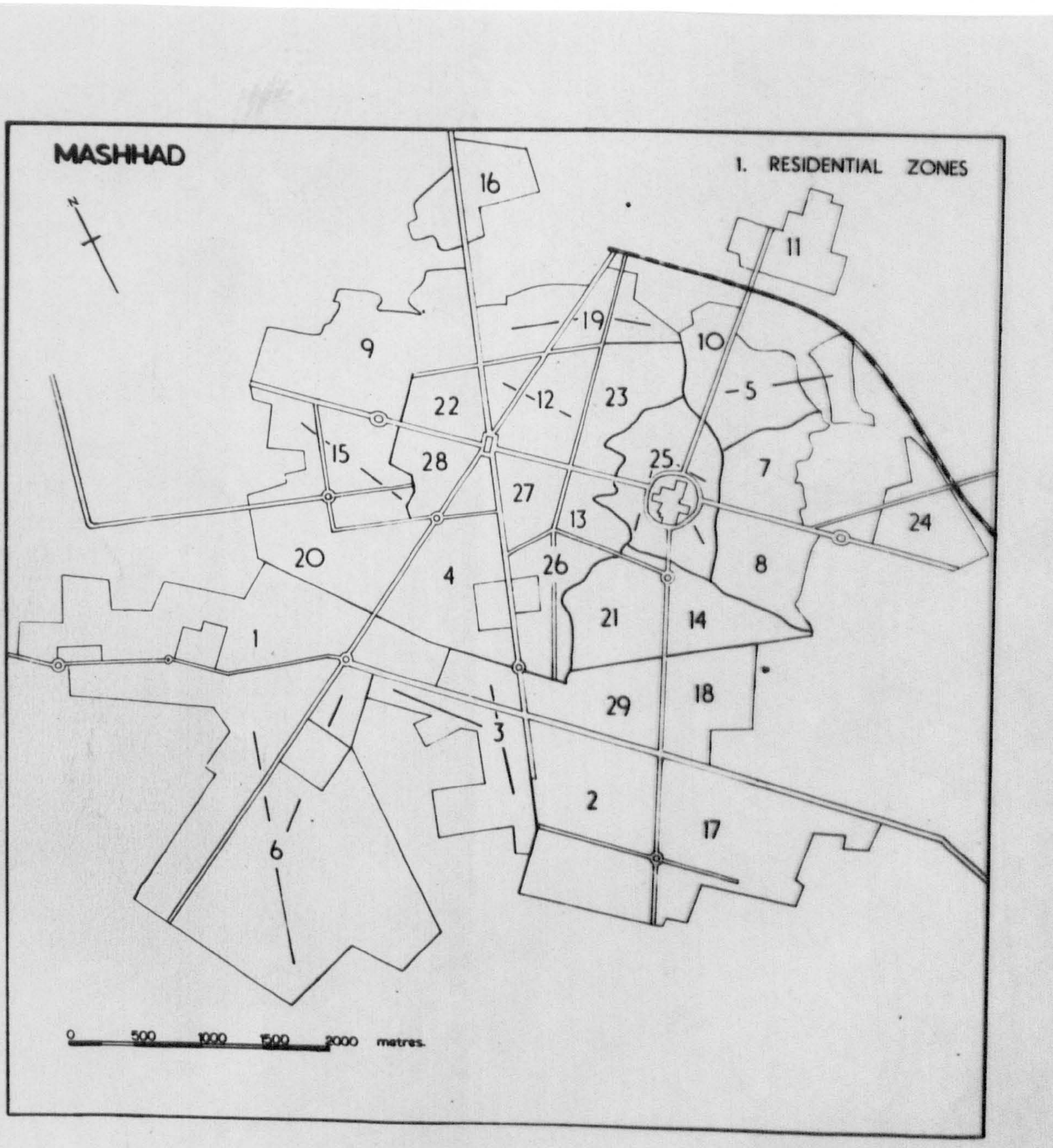
Part III shows how the economic organisation and the distribution of land use and land values in the city are affected by the existence of the Old Town and NewTown populations, with their different demand characteristics. A model of thebazar economy is constructed as a basis for the discussion of modern trends and this is followed by a statistical analysis of the distribution of functions in the city and by a study of the central place structure. Two city centres of high land values are evident. The Old Town centre is based on the shrine and the bazars which surround it, whilst that of the New Town, in the west is a twentieth century development. The industrial and commercial structure of the city, and particularly that of its two central areas is shown to be partially a product of the differing demand characteristics of the two populations (identified in part II) tributary to these two centres.

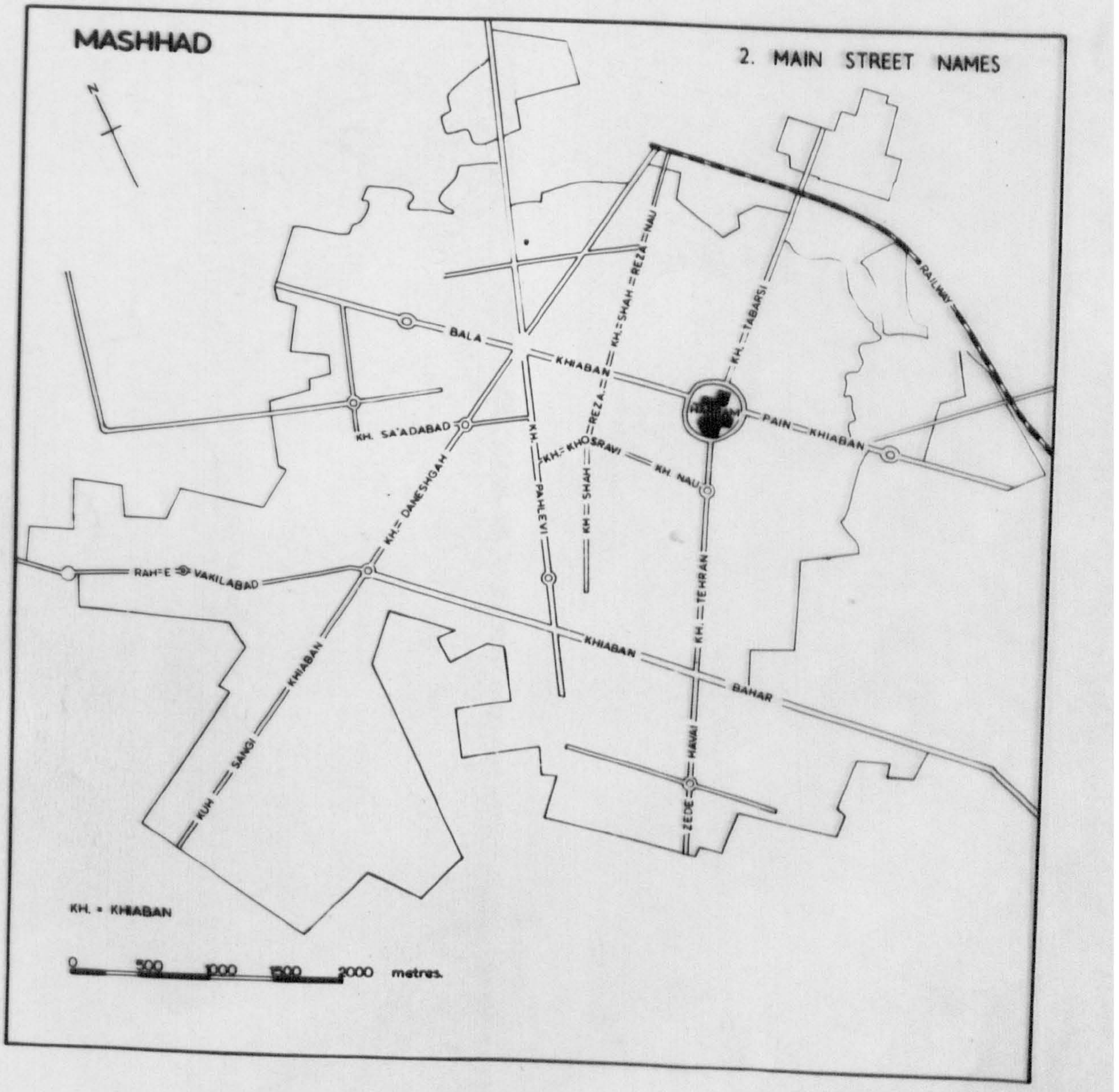
Conclusions are presented in part IV.

1. Between rows V = $\frac{\text{between rows mean square minus residual mean square}}{n_1}$

2. Between columns V. = $\frac{\text{between columns mean square minus residual mean square}}{n_2}$

3. Residual V. = the remainder.


MASHHAD
1. RESIDENTIAL ZONES
N
16
11
19
9
10
22
12
23
5
15
28
25
7
27
13
24
20
4
26
8
21
14
1
29
18
3
2
17
6
0
500
1000
1500
2000
metres


MASHHAD
2. MAIN STREET NAMES
N
BALA KHIABAN
KH. SA'ADABAD
KH.= DANESHGAH
RAH=E VAKILABAD
KUH = SANGI KHIABAN
KH.= SHAH = REZA = NAU
KH.= TABARSI
RAILWAY
KH.= KHOSRAVI = KH. NAU
KH = SHAH = REZA.=
KH.= PAHLEVI
PAIN = KHIABAN
= TEHRAN
KHIABAN
BAHAR
HAVAI
ZEDE
KH. = KHIABAN
0 500 1000 1500 2000 metres.